Department of Energy
Field Office, Idaho
785 DOE Place
Idaho Falls, Idaho 83401-1562

April 24, 1992

Mr. Wayne Pierre, Chief
Federal Facility Section
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

Mr. Dean Nygard, Federal Facilities Supervisor
Idaho Department of Health and Welfare
Division of Environmental Quality
Community Programs
1410 North Hilton
Boise, Idaho 83706

SUBJECT: Transmittal of the Addendum for the Response to Comments for the Draft Sampling and Analysis Plan (SAP) for Operable Unit (OU) 3-07 at the Idaho Chemical Processing Plant (ICPP) Waste Area Group 3 (WAG 3) - RPO-091-92

REFERENCE: (1) Letter from D. Nygard to J. L. Lyle, "Review Comments for the Sampling and Analysis Plan (SAP) for Operable Unit (OU) 3-07 at the Idaho Chemical Processing Plant (ICPP), Waste Area Group 3 (WAG 3)," dated April 2, 1992

(2) Letter from E. Liverman to C. L. Nash, "Draft Idaho Chemical Processing Plant Sampling and Analysis Plan for Operable Unit 3-07," dated April 3, 1992

Dear Mr. Pierre and Mr. Nygard:

Enclosed are six copies of the addendum for the Draft SAP for OU 3-07 which contains the response to comments as discussed in the WAG 3 Manager's conference call of April 16, 1992.

If you have any questions, please contact C. L. Nash at (208) 526-5922.

Sincerely,

Jerry Lyle, Deputy ~~Assistant~~ Manager
Environmental Restoration
and Waste Management

Enclosure

bcc: ARDC Files, EG&G, w/enc.

EPA Region X and State of Idaho
comments on
WAG 3 Operable Unit-07

Sampling and Analysis Plan
ICPP Tank Farm

United States
Environmental Protection
Agency

Region 10
1200 Sixth Avenue
Seattle WA 98101

Alaska
Idaho
Oregon
Washington

EPA

April 3, 1992

Reply To
Attn Of: HW-124

Constance L. Nash
Environmental Restoration Division
U.S. Department of Energy
785 DOE Place
Idaho Falls, Idaho 83401-1562

Re: Draft Idaho Chemical Processing Plant Sampling and Analysis Plan for Operable Unit 3-07

Dear Ms. Nash:

The enclosed comments pertaining to the above-refeenced document are offered for your consideration.

If you have any questions or comments, I may be contacted at (206) 553-1752.

Sincerely,

Earl Liverman

Earl Liverman
Federal Facility Section

Enclosures

cc: Tom Stoops, IDHW

ENVIRONMENTAL PROTECTION AGENCY REGION 10

REVIEW COMMENTS
IDAHO CHEMICAL PROCESSING PLANT
SAMPLING AND ANALYSIS PLAN
FOR OPERABLE UNIT 3-07
TANK FARM AREA

FIELD SAMPLING PLAN

General Comments

1. The numerous suggestions made to transfer sites between sites (refer to Sections 2.2.1.3, 2.2.3.2, 2.2.4.3, and 3.1.4.2), to create OUs (refer to Sections 2.2.3.2, 2.2.4.3, 3.1.1.2, and 3.1.4.2), or to perform a specific action (refer to Section 3.1.3.4) are inappropriate and should be deleted.

2. Provide a compendium of all WINCO SOPs such as WINCO SOP 3.26 and Calibration Procedures for WINCO Calibrated Instruments, that are incorporated by referenced in the FSP and QAPjP.

3. It would be useful to include a schedule of field activities.

Specific Comments

4. Section 2.1

   For each site, only a succinct summary of the site background that is designed to familiarize the sampling team in the field need be presented in the FSP. To the extent practical, if site-specific information is already contained in another document (e.g., the Track 1 evaluation) it need only be referenced.

   Adoption of this approach would minimize needlessly repetitive narration.

5. Section 2.1.1

   A. Include an ICPP site-wide figure in order to place the OU3-07 composite map within a meaningful context.

   B. Include an ICPP site-wide figure of background radiation measurements.

   C. Revise the composite map so that the areal extent of CPP-26 is accurately depicted.

   D. Include a brief description of the labyrinth of utility lines installed beneath the High Level Liquid Waste Tank Farm.

6. Section 2.2

Delete sections entitled "Results of Track 1 Evaluation" and "Summary and Recommendations."

7. Section 2.2.1.1

A. Reference to "original releases which predated 1976" and Figure 2-5 are inconsistent with the characterization of CPP-26 as a one-time air release event.

   (See also Section 2.1.2.2 reference to "[l]iquid dripped from the hose coupling for several hours.)

B. The synthetic membrane should be discussed in concert with excavation and surface radiation surveys to accurately portray the likelihood of surface contamination.

C. Revise Figure 2-5 to include both generator and artifact as parameters.

   (This comment also applies to Figures 2.7 and 2.8.)

8. Section 2.2.2.1

A. WAG managers will determine exposure assumptions on a site-specific basis. Therefore, the reference to fifteen feet as a constraint should be deleted.

B. The speculative effect of institutional controls to minimize occupational risk should be deleted from both the text and Figure 2-7.

9. Section 3.0

A. The enclosed tables (Enclosure A) are recommended for your adoption. With minor modifications, the tables would organize field investigation objectives and data quality objectives in a concise and cogent fashion.

   Once the tables are completed, they would then be incorporated within a broader investigation framework that would, for example, describe observation well and groundwater monitoring well locations as well as other pertinent sampling information.

   Adoption of this approach would minimize needlessly repetitive narration, and facilitate an orderly arrangement/consolidation of information.

B. To the extent practicable, clearly identify the release source on each figure.

10. Section 3.1

The necessity for monthly and quarterly monitoring of observation wells at CPP-26 and CPP-31 is not substantiated. Unless demonstrated otherwise, only one radiation profile appears appropriate for the stated objectives.

11. Section 3.1.3.1

Without explanation, reference is made to a leaking pipe in close proximity to observation well 81-13. The applicability of this pipe to the investigation must be addressed or the reference deleted.

12. Section 3.1.5.2

Physical properties such as bulk density, particle size distribution, permeability, and porosity, that are to be determined from the core sample must be listed.

13. Section 3.2

Two or more additional groundwater monitoring wells appear necessary to address the objective of evaluating perched water and potential sources of contamination. Probable locations for the additional wells are found between Well 55-06 and the following potential source areas: percolation ponds south of the South Perimeter Road; storage area west of Evergreen Street; and Building 659.

14. Section 3.2.2

"Fingerprinting" or pattern recognition techniques should be employed as part of the sampling of the new groundwater monitoring wells to assist in discerning potential sources of contamination.

15. Section 3.2.3

The 1992 sampling event should include the same analytes as the 1990 and the 1991 events.

16. Section 4.0

Revise to include groundwater monitoring well installation procedures.

17. Section 4.2.1.3

A. Sub-Item u. Describe "some upper activity limit" and identify the "appropriate" WINCO facilities.

B. Sub-Item x. Cite the State of Idaho regulation to be followed for the abandonment of wells.

QUALITY ASSURANCE PROJECT PLAN

General Comments

18. The QAPjP must clearly state the applicability of SW-846, as distinguished from CLP, to the ICPP.

19. Refer to the enclosed QAPjP checklist (Enclosure B) as guidance for finalization of the WAG-wide QAPjP.

Specific Comments

20. Section 3

    The WAG 3 description should be confined to Section 2. The project description, unless incorporated by reference, should be presented in this section.

21. Section 4

    When known, the identity of specific key personnel should be included as an addendum to the site-specific FSP.

22. Section 5.1.3

    Critical data points should be identified in the completeness statement.

23. Section 8

    Identify the calibration procedures for each parameter measured (include field and laboratory testing).

24. Section 9

    For each measurement, either the applicable SOP or analytical procedure should be referenced or a written description of the analytical procedure to be used should be provided. In this instance, both "probe" and "SOP" are inadequate descriptions of analytical methods.

25. Section 10

    Revise this section to conform to the enclosed laboratory documentation requirements for data validation (Enclosure C).

IDAHO DEPARTMENT
OF HEALTH AND WELFARE
DIVISION OF
ENVIRONMENTAL QUALITY

1920 East 17th Street, Suite 202, Idaho Falls, ID 83404-8036, (208) 525-7300

Cecil D. Andrus, Governor Richard P. Donovan, Director

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APR - 6 1992

April 2, 1992

Mr. Jerry Lyle, Deputy Assistant Manager
Environmental Restoration and Waste Management
U.S. Department of Energy
Idaho Operations Office
785 DOE Place
Idaho Falls, Idaho 83402

Subject: Review Comments for the Sampling and Analysis Plan (SAP) for Operable Unit (OU) 3-07 at the Idaho Chemical Processing Plant (ICPP), Waste Area Group 3 (WAG 3)

Dear Mr. Lyle:

We have reviewed the above referenced plan which the U.S. Department of Energy (DOE) provided to the Idaho Department of Health and Welfare (IDHW) on March 3, 1992.

Enclosed are IDHW's technical review comments. IDHW is submitting these comments on the April 3, 1992 deadline, as required for secondary documents. We look forward to discussing these comments with you and your staff and receiving the final SAP.

Should you have any questions, please contact Dean Nygard at (208) 334-5879 or Thomas M. Stoops at (208) 525-7300.

Sincerely,

M. Shawn Rosenberger for

Dean Nygard
Federal Facilities Supervisor
Remedial Activities Program

DN:kmc
enclosure
cc: Constance Nash, DOE-ID
Shawn Rosenberger, DEQ-IF
Tom Stoops, DEQ-IF
Wayne Pierre, EPA Region X

REVIEW OF OU 3-07 FSP
PREPARED BY WINCO FOR DOE
TANK FARM AREA
STATE OF IDAHO FORMAL COMMENTS

Specific Comments:

FORWARD

1) Page v, Second Paragraph

The objective of the track one screening is to determine the next appropriate action under the FFA/CO. The presence of significant data gaps indicating unacceptable risk potential, implies the need to move to track two or remedial investigation.

As the six track ones have yet to be formally accepted, it may be appropriate to state that if the State or the EPA do not agree with the decisions made they would be added to the WAG wide RI.

Recommending that the entire Tank Farm be considered a separate operable unit, with it's own Remedial Investigation is premature at this point. No proposal has been recieved by the State indicating DOE's desire to create an operable unit.

INTRODUCTION

2) Page 1, First Paragraph

If we move the perched water to a separate Operable Unit, then we will need to clarify this paragraph, see general comment #3.

3) Page 1, Second Paragraph

The data collected will be used to assess the human health and environmental risk associated with alleged contaminant sources.

Further, the data collected during the track two investigation is used for a qualitative evaluation of risks, assessment of risks only occurs following or as part of a Remedial Investigation.

PROJECT DESCRIPTION

4) Page 2, Section 2.1.1

Please tabulate the site descriptors with their titles, i.e.
CPP-14 Sewage Treatment Plant, followed by contaminant source.

5) Page 4, Figure 2-2

Please enhance the well locations to make them more visible on the figure, particularly the six lysimeters and five monitoring wells alluded to in the text.

6) Page 5, Section 2.1.2.2

What process(s) generated the fluids that were normally transported in these lines such that contaminants were able to be released through the failed hose coupling?

What volume of liquid was released from the leaking hose coupling?

Has surficial soil radioactivity been quantified in this area due to the liquid released?

Were soil samples taken in order to characterize the liquid spill?

Were soil samples taken within the steam contaminated area?

7) Page 5, Section 2.1.2.3

Is it possible to estimate the volume of steam, liquids, heavy metals or radionuclides released?

What other contaminants may have been present in the lines prior to decontamination procedures?

8) Page 5, Section 2.1.3.2

Did contractor discover the contaminated soil in a discrete horizon, as implied by the "six foot" notation, or was the highest reading encountered at six feet?

If the highest reading was encounter at six feet, does adequate information exist to give a vertical description of values measured?

Did the investigation review team assemble to identify the "cause" of contamination, or identify the "source" of contamination?

What is occasional? How much high level acidic waste may have been released?

How is it that the upper portion of the secondary containment pipe was corroded, is the lower section composed of different, more resistant material?

9) Page 6, Section 2.1.3.2

Was the contaminated soil characterized prior to shipment to the Central Disposal Area?

Is the Central Disposal Area analogous to one of the CFA Landfill Cells, and if so which one?

Were the five yards of contaminated soil left due to previous less stringent requirements?

Is there a Standard Operating Procedure for the installation and monitoring of the "observation wells"?

10) Page 6, Section 2.1.3.3

Why are acids, radionuclides and volatile organics not considered hazardous constituents of potential concern?

What processes where associated with the fluids that flowed through the failed line?

11) Page 6, 2.1.4.2

How is the estimate of volume (600-800 cy) derived?

12) Page 7, Figure 2.3, Contaminated Soil at CPP-28

Please reference in text.

Please show both WRN-1037 and WRV-137 on the supplied figure.

13) Page 8, Table 2-1

Are the values presented corrected due to any shielding effects caused by the use of a metal casing?

Are the values based on total alpha, beta and gamma emissions?

Add to table title to clarify which site is involved, is "test hole" same as "observation well"?

What does the note "Casement is at elevation (-)7'-0" mean?

14) Page 9. Section 6. 2.1.4.2 continued

If tank 180 is due west of tank 181, how is it that the contaminated area is south of tank 181?

How is the 14,000 gallon estimate derived?

Of the 14,000 gallons spilled, can it be estimated how much evaporated and how much infiltrated, along with estimated mass of constituents released ?

15) Page 9. 2.1.5.2

What process is associated with the valve in the valve box? Are the contaminants identified associated with that process?

16) Page 10. Section 2.1.6.2

Where did the decontamination solution originate, what was being deconned?

If 2500 gallons were spilled, how is the contaminated volume (150 cy) derived?

17) Page 10. Section 2.1.6.3

Why are the radionuclides and acids not considered hazardous constituents of concern?

18) Page 10. Section 2.1.7

This should be moved to a separate operable unit, see general comment #3.

19) Page 10. Section 2.1.7.2

How was the contamination discovered?

How many interbeds occurred between 68' bgs and 123' bgs?

What was the thickness of each interbed?

Where is the screened interval in the well constructed?

Does perched water occur on the upper boundary of each interbed?

20) Page 10, Section 2.1.7.1

The sedimentary interbeds are not reflected on the log of boring 55-06, please clarify.

For which interbed are the chemical analyses related to?

21) Page 11, Figure 2-4

Please include interbeds, if known.

22) Page 12, Table 2-2

What SW-846 Methods were used to generate the results?

Why are all, but Potassium and Magnesium flagged with a "J"?

What prior knowledge lead to the decision to analyze for the contaminants listed?

23) Page 15, 2.1.7.2 Continued

Please submit the results of the April 1991 groundwater sampling to the State and EPA as background information?

A location map of the wells be should be included, in order to evaluate the spatial representativeness of the information presented.

Lithologic well logs and well construction logs should be submitted along with geologic cross sections, oriented North/South and East/West showing interpolations between borings in order to define the subsurface charateristics and assist in the clarification of data gaps.

24) Page 15, Section 2.1.7.3

Revise annotation to the 110' interbed.

Why are cesium and yttrium not considered as being in the perched water, when they are shown on Tables 2-3a and 2-3b?

Is there an explanation for the "high" calcium content noted in April, 1991 (478 ppm vs 25-50 ppm being average)?

Re-iterate that to date, no specific source or process has been identified, related to the contamination encountered.

25) Page 15, Section 2.1.8.1

Figure 2-2 is inadequate for showing the locations of the mentioned lysimeters and monitoring wells, please enhance.

Naming nomenclature varies between the two paragraphs for lysimeters, this should be more clearly defined (tabulated) and corrected.

Figures should be located closer to their related text, or all figures should be placed in one section.

26) Page 15, Section 2.1.8.2

Will any types of aquifer testing be performed on the perched aquifers to determine subsurface hydraulic parameters?

27) Page 16, Section 2.1.1.1 CSM, Third Paragraph

The statement "so any residual surface contamination would not be expected to exist from the original releases which predated 1976", conflicts with previously provided information, which only talks about a single release, therefore was there more than one?

Why is no contamination expected to exist? Please clarify.

28) Page 16, Section 2.1.1.1 CSM, Fourth Paragraph

These statements need to be rephrased to include a discussion of absorption, leachability, retardation, dispersivity, fate and transport. Dilution is not considered to be an applicable risk modifier.

The track two investigation SAP will guide collection and analysis of data required to evaluate the groundwater pathway hazard. The stated allegations, whereas they are correct, are not appropriately included in the present discussion of the Conceptual Site Model.

29) Page 16, Section 2.1.1.1 CSM, Fifth Paragraph

If the area is covered with two feet of topsoil and a synthetic cap, how are the soils an exposure risk, unless the liner cover is now contaminated?

30) Page 18, Section 2.2.1.2

Figure 2-6 should clearly delineate the sites mentioned.

Are the liquids mentioned here the same as those mentioned in section 2.1.2.2 that dripped from the coupling?

What volume of liquid had to be stabilized and how was it stabilized?

Where were the removed solids taken to for disposal?

Were the soil samples taken from areas effected by the drip or by the steam release?

How was background determined?

31) Page 19, Section 2.2.1.3

Do any records show where the excavated soils were disposed/stockpiled?

Please note tanks WM 189 and 190, along with buildings CPP 699 and 654 on figure 2-6 more clearly?

Where any characterizations performed on the excavated materials?

It is not clear at this point how the two different type releases (steam vs liquid) will be handled, please clarify.

32) Figure 2-6

Please label the artifacts of concern clearly.

33) Table 2-4

Is Cr-144 mislabeled, should this be Ce-144 or Cs-144?

What is DOE/ID-10340(91)? *(The Track 1 Guidance)*

Please remove notes, these opinions are more suitablely included in written sections.

Of the Hazardous Constituents listed which are "non Rad", why are the heavy metals listed in paragraph 2.1.2.3 omitted?

34) <u>Section 2.2.2.1 CSM</u>

Please clarify how fifteen feet was arrived at?

What are the suspect other mechanisms? What pathways?

The last sentence is both awkward and non-substantitive, please correct and clarify, excavations occur regularly at the ICP.

35) <u>Section 2.2.2.1 CSM, Second Paragraph</u>

Rewrite, without redundancy.

36) <u>Section 2.2.2.2</u>

How was the 61 yard value determined?

Do records reflect 5 yards being left in place, or is this a calculated value?

At what point is a radioactivity reading defined as "high radioactivity"?

Range implies an upper and lower bound, what is the lower bound?

Risks associated with metals, organics and acids should also be discussed and evaluated during the Track Two, even if rads are the risk driver.

37) <u>Figure 2-7</u>

Site personnel cannot be excluded from the conceptual site model due to Health and Safety SOP's.

As stated in the NCP, RAGS and re-iterated in the Track One guidance, the current occupational scenario must be included in the evaluation of Human Health Risks.

38) <u>Page 25, Section 2.2.2.2 CPP-31</u>

From statements made, are we to assume that in excess of 800 cubic yards of soils are now contaminated (since the area of concern has expanded beyond the capabilities of the monitoring system, the original estimate of 600-800 cy was made in 1975)?

How was the value 2.4E+04 Curies established?

Risk values associated with the contaminants of concern, which include metals, acids, organics cannot be fully evaluated using only observation wells.

39) <u>Page 25, CPP-79</u>

How is it determined that 2500 gallons contaminated 150 cy of soil?

Risk evaluation should include metals and organic compounds if they are considered part of the source.

40) <u>Page 25, CPP-28</u>

It appears that an adequate amount of information exists to go to interim action as opposed to an RI. Additionally, this may be a site where it is appropriate to perform a Track Two Technical Demonstration. Further, since an "observation" well is sensitive to only radionuclide contamination, and cannot ascertain the concentration of other constituents of concern listed in 2.1.3.3, this action only fills one data gap. How will the other data gaps be filled during this track two investigation?

41) <u>Page 26, CPP-31</u>

Given that radioactive materials have migrated beyond the effective range of the existing "observation" wells, and that Kd values for the radionuclides, listed in 2.1.4.3, are generally higher than other contaminants listed, and would have therefore not been transported further, sampling of soils beyond the "high" radiation area would assist in defining fate and transport issues and allow for better characterization of the volumes of material that will require remediation.

42) <u>Page 26, CPP-79</u>

The "observation" well anticipated will provide information on the level of radioactivity present, however no information regarding the volatiles, heavy metals or fluoride would be obtained. Therefore, it appears that more "observation" wells would be required to define the subsurface extent of the radioactive contamination, along with soil sampling to define the extent of non-radioactive contaminants?

43) <u>Page 27, Section 2.2.4.1, First Paragraph</u>

It has been well documented that aquitards exists beneath the surface of the INEL, and are composed of alluvial deposits, eolian deposits and massive Basalt deposits. The presence of vertical fractures, (which provide the primary pathway to the aquifer) due to columnar jointing, is a well known cooling/lithification phenomena in the SRP Basalts, however the vertical extent of these fractures is unquantified, along with type and quality of fracture infilling material. Further, the horizontal fractures, which allow for lateral migration, are not well defined and their overall hydrologic impact has yet to be quantified. The perching of groundwater is dependent on the aquitard materials on which the groundwater perches and the overlying hydraulic head. Additionally, it has not been shown whether flow within the SRPA is stratified (limited mixing) or turbulent (well mixed), and therefore conclusions about dilution cannot be made at this point. State simply and concisely that a potential exists for contamination in the perched water zones beneath the ICPP to migrate to the SRPA.

44) Page 27, Section 2.2.4.3

Additional rounds of samples from Well 55-06 will produce analytic information, but will not substantially refine the knowledge base of the contamination known to exists at well 55-06. If the additional sampling shows reduced levels of contaminants; does this mean they are being diluted, if so, where is the additional water coming from, or has the plume migrated to a new location, if so, what are the driving forces and where will it move to? We should use the additional time allowed by the track two investigation to help refine our approach to resolving these type questions concerning the perched water encountered by Well 55-06.

45) **WHICH "TYPE" CONCEPTUAL SITE MODEL IS CPP-32E ASSOCIATED WITH?**

46) Page 30, Section 3.1

The observation well approach works for defining radioactivity levels, while protecting workers. However, other constituents of concern have been identified in previous text and using the presented approach does not address these analytes, some of which are more soluble and mobile, and could be risk drivers.

46) Page 31, Table 3-1

Frequency is not listed in each activity and those listed conflict with previous text, monthly vs quarterly. Please clarify.

For CPP-26, it appears that if radioactivity is not encountered, then no sampling for other analytes would occur, please clarify.

For CPP-26, Since an air release occurred, how will clean up of the subsequent surface contamination be documented?

For CPP-28, how will other contaminants besides radionuclides be evaluated?

For CPP-31, how will other contaminants besides radionuclides be evaluated?

For CPP-32E, how will other contaminants besides radionuclides be evaluated?

For CPP-79, how will other contaminants besides radionuclides be evaluated?

Single point observation wells or subsurface borings, will not provide information regarding the lateral extent of contamination.

For Well 55-06/Tank Farm Wells - What geotechnical studies will be performed which will support our characterization?

For Well 55-06/Tank Farm Wells - What are the parameters of the statistical evaluation of groundwater analysis?

For Well 55-06/Tank Farm Wells - Please submit the ICPP Groundwater Monitoring Plan, with SOP's.

Characterization is not the same as risk evaluation or risk assessment, differing levels and types of data are required by each, please clarify.

47) <u>Page 32, Table 3-2</u>

Data used for risk management decisions requires level IV data validation packages, see track one guidance for clarification. Levels I through III can be used for characterization and risk evaluation.

Which samples will be considered the critical samples and how many of each type sample are planned to be taken?

Analysis for constituents, other than radionuclides is dependent on levels of activity encountered, and may therefore leave some of the listed analysis unperformed, the table should be noted as such.

Gamma spectroscopy listed as analytic level III, please correct to level V.

48) <u>Page 34, Section 3.1.1.2</u>

Why are radionuclides considered the only risk driver for making the Summary Track Two decision?

Where will background samples be retrieved from? How many background samples will be retrieved? etc.....

Please expand on the sampling event that occurred at the time of release.

A track two study is to support a risk evaluation, not a risk assessment. Risk assessment can only follow a RI study.

Do not bias verbiage to No Further Action, this makes the SAP suspect.

49) Page 34, Section 3.1.1.3

This operable unit was both and air and liquid release, previous text states that the hose coupling dripped for several hours. Revise text to state that the observation well will be advanced to below contaminated areas.

Due to levels of activity encountered it may not be possible to take samples, how will this scenario be handled if encountered?

If grab samples are retrieved, will they be composited over a depth interval?

50) Page 36, Table 3-3

Is there an origin associated with these coordinates, and can these locations be specified using a standard nomenclature?

51) Page 37, Section 3.1.2.2

When were the observation wells plugged and abandoned?

Due to the concern for contaminant migration, how will only one observation point help evaluate this spatially?

This methodology only addresses radionuclide contamination and ignores other probable contaminants, please revise.

52) Page 40, Section 3.1.3.1 and Related Figures

Section A-A' does not go through the center of the contamination as shown on Figure 3-3, please correct.

All wells listed on Figure 3-4 are not shown on Figure 3-3, please revise.

No wells are depicted on Figure 3-3 which are east of the contaminated area, please expand area of coverage, use large paper stock if appropriate.

Please include a three dimensional sketch, this well assist in clarifing the expected shape and configuration of the plume, and may clearly indicate data gaps.

53) Page 40, Section 3.1.3.2

Figure 3-3s show the highest areas to be >30 R/hr, why is this if the highest recorded is 24 R/hr?

If you are using past data, can its quality be assessed?

Please show the location of these plugged and abandoned wells on the revised 3-3 figure?

Can the data used be presented in a tabular format?

How will other contaminants of concern be evaluated if no soil samples are going to be retrieved?

54) Page 43, Section 3.1.4.1

If surface radiation surveys do not indicate readings above background, what is the impetus to perform interim action?

55) Page 43, Section 3.1.4.2

In previous sections it is listed that the constituents of concern are radionuclides, metals and volatiles - performing only a rad survey does not confirm that clean-up has occurred.

The summary Track Two report will contain recommendations and conclusions, it is inappropriate to indicate conclusions in a SAP.

56) Page 44, Figure 3-6

Group with other CPP-31 figures, expand area covered.

57) Page 45, Section 3.1.4.3

"The contamination at this site.... of dissolved semi volatiles.", belongs in the discussion of release history.

58) Page 47, Section 3.1.5.1

Statements regarding the objectives of the investigation appear to conflict, regarding the number and density of pipeways beneath CPP-79. It seems to say that characterization cannot occur due to the number of pipes and utilities beneath the site, but that the objectives are to verify the presence and extent of the alleged contamination. Please clarify.

59) Page 47, Section 3.1.5.2

How will the site be addressed in the RIFS, if as is stated there are an excessive number of subsurface utility corridors that prevent entry or excavation?

If soil cores are taken beneath CPP-79, will some of the soils be submitted for radiologic and geochemical analysis, in order to characterize the contamination?

60) Page 49, Section 3.1.5.3

If a boring is placed within the site boundaries of CPP-79, should it be extended into the basalt, with the purpose of evaluating contamination within the basalt and basalt characteristics?

Again, rad contamination is the only analyte that an observation well will be sensitive to, how are other contaminants going to be addressed if "high" rad levels are encountered?

61) Page 49, Section 3.2

As the Draft Final Groundwater Monitoring Plan for the ICP, has not been submitted to or approved by the state, it's inclusion in this document is inappropriate at this time.

Some samples collected under the Site Wide RI will be subjected to the more rigorous CLP data validation protocols, which is not required for Track Two qualitative risk evaluation, and therefore samples collected under the GWP may or may not be applicable to these investigations.

Additionally, as the subsurface hydrogeologic regime is not well understood, the placement of critical ground water QA samples cannot be made at this time.

What type statistical work is envisioned for the data collected?

62) <u>Page 49. Section 3.2.1</u>

The primary objective of the track two investigation will be to evaluate the risk associated with contaminants known to be in the perched water zone above 110' interbed.

It has been stated in previous reports, that multiple perched water zones exist beneath the ICP, therefore it would of value to tenetively identify each perched zone with a depth value (ie the 110' perched zone).

Will critical samples be collected, if so, are they to be validated at level IV or V. What is meant by "statistical verification of samples"?

A SAP is not the appropriate location to be recommending further actions.

62) <u>Page 50. section 3.2.2</u>

Please submit 3 copies of the Groundwater Monitoring plan for the ICP.

Why is the locating and drilling of monitoring well, specifically for the Perched water zone, that is to be performed in the present fiscal year, not considered part of this investigation?

63) <u>Page 50. Section 3.2.3</u>

Use of existing monitoring wells is satisfactory, however information regarding these wells should be presented either as an appendix or a separate document. Please include lithology logs, drilling logs, installation logs, summarized sampling results from previous sampling events, results of geophysical studies, results of aquifer studies, etc.

Which producing wells will be used and at what depth are the water intakes?

64) <u>Pages 54 and 55. Section 4.2.1.1</u>

Is it required to use stainless steel pipe? What is RTV? What is considered refusal?

65) <u>Pages 55 and 56. Section 4.2.1.2</u>

What is WINCO SOP 3.26? Is it necessary to dispose of retrieved water as "hot" waste? How will evacuated water be disposed of? What are the minimum activity levels the meter can record? Is a "radiation shielding" multiplier applied to the results recorded during the survey, ie will the pipe retard alpha and beta particles?

66) <u>Pages 56-60, Section 4.2.1.3</u>

A soil sample retrieved with a driven or pushed split spoon sampler is not the same as a cored soil sample, please revise. Assuming the sampler is pushed using rig hydraulics, will a record of hydraulic pressures required be taken? It is typical to include the name of the lab(s) that will be utilized for analysis, along with providing the QAPP's. Performing metals analyses by ICP is typically inadequate for risk evaluation, do to poor MDL's, use AA methods. Are WINCO facilities approved to provide Contract Laboratory Services? The upper activity limit should be specified, prior to commencement of field activities. Please specify the soil testing methods that will be utilized for textural and physical property analysis. What activity value defines an area as radioactively contaminated? Plugging and abandonment procedures should be included as an appendix.

67) <u>Page 61, Section 4.2.3</u>

See previous comments.

68) <u>Page 62, Section 4.2.6</u>

Metals by ICP analysis is not considered sufficiently sensitive for some risk evaluations.

69) <u>Pages 62 - 66, Section 4.2.7</u>

See previous comments regarding information required regarding monitoring wells and lysimeters. What size screen was used, what type silica sand, what diameter bentonite pellets, was neat portland cement used or a sand grout, etc...? Is the sand pack considered part of storage volume? If water quality parameters do not stabilize, and a well goes dry, would the previously pumped water be used for sample submission and analysis?

70) <u>Page 68, Section 4.3.2</u>

Equipment blank frequency is not specified in Section 3, but in Appendix A, please correct.

71) <u>Page 72, Section 5.1.1</u>

Why is OU 3-08 mentioned here? Is acidification of samples from Well 55-06 appropriate in light of the high calcium content of the previously analyzed water samples?

72) Page 72, section 5.1.2

DOT shipping regulations are scheduled to be revised, in order to comply with International Airline Association rules, will methods used comply?

73) Page 75, Section 5.1.2.2

Is there a specified turnaround time for samples submitted to the WINCO lab for gamma scan?

74) General Comment

For almost all the sites outlined in the FSP, constituents of concern where radionuclides, metals, volatile organics and fluoride, however samples to be retrieved will not be subjected to a range of analytic work similar to their C-o-C list. Revise forms per previous comments.

75) Appendix A, CPP-26

Do the critical samples require level IV analysis and verification? Why is no trip blank specified.

76) Appendix A, CPP-32E

See comment 75.

77) Appendix A, CPP-79

Do the critical samples require level IV analysis and verification?

78) Appendix A, Well 55-06

Refer to comment #62.

79) Appendix A, Tank Farm Area

Refer to comment #62.

80) Appendix B

Where SOP's are listed, whose are they?

Due to matrix effects (soils) Sample Quantitation limits may exceed concentrations of concern for risk evaluation.

What about analysis of critical samples?

81) Appendix C

Not reviewed or approved by state agencies.

ADDENDUM

TO DRAFT SAMPLING AND ANALYSIS PLAN

OPERABLE UNIT 3-07, TANK FARM

April 22, 1992

ADDENDUM TO DRAFT OU 3-07 SAP

RESPONSE TO COMMENTS

TELEPHONE CONFERENCE CALL MEETING MINUTES
APRIL 16, 1992
DOE-ID / EPA REGION X / STATE OF IDAHO / WINCO

Subject: Response to Comments from EPA and State on OU-07 SAP

In Attendance:
C. N. Nash, DOE/ID WAG 3 Manager
E. Liverman, EPA Region X WAG 3 Manager
T. Stoops, State of Idaho, WAG 3 Manager
D. J. Williamson, WINCO
C. S. Mascareñas, WINCO
L. Matejak, WINCO
L. Dausin, WINCO

ITEMS OF DISCUSSION:

1. RESOLUTION OF COMMENTS - The telephone conference will be the basis for response to DOE-ID comments. Responses to the comments on OU 3-07 SAP will be submitted to EPA and the State in form of meeting minutes. These meeting minutes will form the basis for DOE-ID response to comments to the Draft SAP and will be attached to the SAP as an addendum.

2. FINALIZATION OF SAP - The meeting minutes discussed above will serve as the basis for the response to comments. The SAP will not be revised to include the response to comments. It was generally agreed that the Summary Report would become part of the Administrative Record as this report would be used as part of the decision making process.

3. REDUCTION OF COMMENTS IN THE FUTURE - A monthly meeting will be planned for the end of each month, these meetings will be telephone conferences and will serve as a forum to discuss ongoing and future activities. These meetings will also be used to provide scoping for the content and format of future documents, such as the summary reports. Agenda items will be provided to C. Nash, DOE-ID two or three days before each meeting. The first meeting is scheduled for April 27 at 2:30 and the May meeting will be held on the 27th, time undetermined.

ADDENDUM TO DRAFT OU 3-07 SAP

RESPONSE TO COMMENTS

The following responses to comments were discussed in the aforementioned conference call.

Ref: (1) Dean Nygard ltr to Jerry Lyle, "Review Comments for the Sampling and Analysis Plan (SAP) for Operable Unit (OU) 3-07 at the Idaho Chemical Processing Plant (ICPP), Waste Area Group 3(WAG 3)" dated April 2, 1992

(2) E. Liverman ltr to C. L. Nash, "Draft Idaho Chemical Processing Plant Sampling and Analysis Plan for Operable Unit 3-07" dated April 3, 1992

ENVIRONMENTAL PROTECTION AGENCY

Field Sampling Plan

General Comment Responses:

1. In the future, there will be no references made regarding specific actions anticipated for a site. Except where required as recommendations in the Summary Report.

2. A compendium of WINCO SOP's and Calibration procedures are being compiled and shall be transmitted by April 30, 1992. In addition, the contaminants of concern (COC) are being re-evaluated using the new exposure scenario assumptions. The revised list of COC's will be transmitted with the April 30, 1992 submittal.

3. A pre-construction meeting will be held in May to delineate the appropriate sequence of field activities. A detailed field schedule will then be prepared and transmitted to the agency's. This schedule shall be transmitted by June 5, 1992.

Specific Comment Responses:

4. Due to the turnaround time allowed for revisions, the Draft SAP is not being revised. However, all future submittals shall make use of references and an effort to provide succinct summaries will be made.

5A. In the future, a site wide figure shall be included in the Summary Report in order to place OU 3-07 within a meaningful context.

5B. An ICPP site-wide figure of background radiation measurements is unavailable. However, in future documents where background readings are referenced, the applicable background level shall also be provided.

5C. In the future, composite site figures shall clearly show all site boundaries.

5D. The HLLW Tank Farm originally began operation in 1954. Since that time a total of 18 stainless steel tanks have been installed with volume capacities ranging from 18,000 to 318,000 gallons. As a result, an extensive system of underground utilities, to support transfers between tanks and the cooling systems of the tanks, was installed. Due to this myriad of underground utilities, the characterization of sites within the tank farm will be limited.

Included in attachment B, as a response to comment number 9B, are the site locations which are overlain on the utility maps to illustrate limitations in sampling.

6. In future documents, attempts will be made to streamline presentation of the data and information presented.

7ABC. A revised CSM is included in attachment A to this addendum to address these comments.

8AB. As a result of additional guidance provided for Track 2 Risk Evaluations, the CSM has been revised and is included as attachment A to this addendum. The scenarios are presented in the discussion.

9A. Due to the turnaround time allowed for revisions, the Draft SAP is not being revised. However, all future submittals shall make use of references and an effort made to provide succinct summaries and an orderly arrangement/consolidation of information.

9B. Revised figures which clearly identify release sources are included in attachment B to this addendum.

10. Quarterly monitoring was specified in the SAP due to the fact that this monitoring could be easily integrated into the monitoring program currently being conducted on existing observation wells at site CPP-31. However, since no change in migration is expected over the 3 month period prior to preparation of the Summary Report, the monitoring scheme shall be revised to include only one monitoring event. The quarterly monitoring shall continue to be done by the WINCO Radiation Engineering Section. However, the information will not be used unless necessary in the future.

11. The leaking pipe was the carbon steel line (3" WRN-1037) which was the source of the spill.

12. The physical properties to be determined are listed on the DQO Summary Form for site CPP-79. However, based upon sensitivity analysis of the groundwater model GW Screen, the most sensitive parameters which could affect the model output are the Kd value and thickness of the interbeds. Therefore, at this time it is not necessary to collect physical properties.

13. Based upon evaluation of data deficiencies and the fact that site 55-06 is the perched water at this location and is part of an site-wide

perched water zone, it has been agreed that the data objectives for this site shall be to : a) evaluate existing information such that a current depiction of hydrogeological conditions can be made and b) a round of groundwater samples as described in the draft SAP shall be taken in order to provide current analytical data regarding the perched water at well 55-06 and in those wells adjacent to the tank farm. Further evaluation of the source, extent and contamination associated with the perched water zone shall be included in future investigations.

14. Not applicable per response #13.

15. The 1992 groundwater sampling event shall include the same analytes as the 1991 events.

16. Not applicable. Refer to response #13 above.

17. Refer to State response #10.

Quality Assurance Project Plan

General Comment Response

The Quality Assurance Project Plan (QAPjP) for Characterization Activities at WAG 3 is being revised to incorporate the following responses. This revised QAPjP will accompany the SOP submittal scheduled for April 30, 1992 (see EPA comment 2).

Specific Comment Responses

18. Both SW-846 and the CLP may be used at WAG 3, so long as these analytical methods meet the DQOs for each site. The applicability of these procedures, as well as all other analytical methods, is evidenced by the DQO Summary Form. For the Track 2 Investigations at OU 3-07, Analytical Levels I and III have been selected based on the Track 1 and 2 guidance documents. Future investigations may demand different Analytical Levels. The QAPjP was left general enough to encompass the wide variety of sampling and analytical activities that may occur. Site specific details were left to the DQO Summary Form and the Method Selection Worksheet. During the next revision, section 9 of the QAPjP will be modified to explain the Analytical Level process which drives the applicability of SW-846 and the CLP.

19. The referenced checklist will be used for finalization of the QAPjP. In general, the QAPjP incorporates all of the criteria of this checklist. However, many of the specifics this checklist calls out are left to site-specific documents and forms. In these cases, the QAPjP will deviate from these criteria in order keep the QAPjP applicable to all investigations.

20. Both sections 2 and 3 have been revised to incorporate this comment. The description of WAG 3 has been moved to the Introduction paragraph of Section 2, and the generic project description has been added to

section 3. Site specific details, as described in response to comment 18, are included on the DQO Summary Forms and the Method Selection Worksheets.

21. An appendix has been added to the QAPjP which identifies the specific personnel of figure 1 by name and phone number.

22. Critical data points are identified on the DQO Summary Form on a site by site basis. It is not feasible to include the specific critical data points within the text as the QAPjP would not be able to remain applicable to all OUs within WAG 3.

23. An appendix will be added to the QAPjP which identifies all known calibration procedures for this and all future operable units. At this time it is impossible to cite the laboratory specific calibration procedures since we have not awarded any analytical contracts. However, this QAPjP demands that the laboratory follow specific standard analytical procedures for each sample and that the instrument be calibrated according to standard method procedures and any manufacturers recommendations. Once the laboratory contracts are let, the laboratory specific calibration procedures will be attached to this QAPjP.

24. The terms "probe" and "SOP" have been removed from the Method Selection Worksheet and the actual reference is now called out.

25. The laboratory documentation reference will be used as part of the data validation process for WAG 3. During finalization of the QAPjP, this document will be incorporated and/or referenced in section 10 of the QAPjP.

IDAHO DEPARTMENT OF HEALTH & WELFARE

Specific Comment Responses:

1. At the time of preparation of the Draft SAP, the preliminary Track 2 guidance allowed the use of the Track 1 screening process as a tool to evaluate existing data and if enough data existed then a recommendation to have those sites continue as a Track 1 site verses a Track 2 site would be made with a recommended decision. The six track 1 sites referred to on page v, second paragraph, fell into this category. The sites were recommended for "no action" for the following reasons:

   - CPP-16: The site has since been excavated.
   - CPP-20: The site has since been excavated.
   - CPP-24: The site was reportedly cleaned up.
   - CPP-25: The site has since been excavated.
   - CPP-30: The site was reportedly cleaned up.
   - CPP-32W: The site cannot be located. The risk in degrading the membrane cover in order to find the site is considered to outweigh the risk caused by the site.

Since the time the draft SAP was transmitted to the State and EPA, further guidance has been given which now requires that the six sites be carried through to the summary report for OU 3-07. The Summary Report which addresses all sites in OU 3-07 will be transmitted to the EPA and the State on March 1, 1993.

In the future, references to the Tank Farm being addressed in an RI/FS will not be made unless as appropriate in the Summary Report.

2. Refer to response to EPA comment #13.

3. Agree, as described in page v, this was the original premise of the draft SAP.

4. In future documents, site descriptors will follow site titles.

5. A revised figure is included in attachment A. The language in the text should have read "five lysimeters and five monitoring wells. (see also comment # 25)

6. The process associated with the three transfer line was high level liquid waste (HLLW) from the tanks in the tank farm.

   The volume of liquid released cannot be derived from the background information.

   Yes, A surface radiological survey indicated several hot spots in the area. These hot spots have been removed and disposed of properly.

   Soil samples were taken in 1975 to determine radioactive constituents (see track 1 documentation).

   One sample was taken of the mud within the steam contamination release.

7. The volumes cannot be derived from the background information. The lines being decontaminated were used to carry HLLW in the tank farm.

8. The area of the spill was first encountered at six feet. See Table 2-1, this table shows the vertical distribution of radiation levels in the observation wells. The greatest radiation level of 90 R/hr was detected at a depth of eight feet.

   Both were identified.

   A release would occur only if all the valves between the transfer points were not completely open and the liquid in the pipe backed up to the level of the hole in the pipe. It was originally estimated that up to 120 gallons of high level waste had been released.

   The upper portion of the secondary containment pipe was made out of carbon steel pipe and the lower portion was made out of stainless steel.

The exposure to concentrated acidic waste resulted in corrosion of the carbon steel upper portion.

9. The soil was analyzed for only radionuclide constituents prior to shipment to the Central Disposal Area.

Unable to determine from the background information.

The remaining five yards were left due to the high levels of radiation associated with them.

There is a standard operating procedure in place for the monitoring of the "observation wells". However, there is no procedure for the installation because of the design concerns of each well which must be addressed.

10. The term "hazardous constituents" refers to a RCRA definition of a hazardous constituent. Therefore, radionuclides were not included. In addition, once the acids are released to soil what remains is the mineral component of the acid. Of the suspected minerals, only fluoride is considered a hazardous constituent.

High level liquid waste was being transferred through the transfer line.

11. The volume of soil was taken from a final report prepared following the incident. The volumes were derived from the results of the "observation well" findings.

12. A revised figure is included in attachment A. Based upon further evaluation of the artifact location, the site location has been revised. Based upon the new location and the 5 foot clearance required from underground utilities a observation well at CPP-28 cannot be placed. Existing information shall be used to evaluate the risk potential.

Line and valve WRN-1037 and WRV 147 are not associated with this Figure. These are shown on figures associated with CPP-31.

13. The values presented are not corrected due to shielding effects caused by the use of a metal casing. The values represent gamma radiation.

A revised table is included in attachment A. An observation well is the same as a test hole.

The note refers to the depth of the original line.

14. Reword to clarify. During transfers, fluids are sent to central lines for diversion to the appropriate tanks.

The 14,000 gallon estimate was derived from review of background information for the Track 1.

Of the 14,000 gallons spilled, it is unknown how much of the liquid evaporated or infiltrated into the soil. However, due to the depth of the release most of the liquid would have infiltrated. The mass of constituents released is unknown and cannot be derived from the background information.

15. The valve box is used for direct control of the HLLW tank associated with the valve box. The contaminants identified are associated with HLLW.

16. The decontamination solution came from the Waste Calcine Facility and the New Waste Calcine Facility. The solution has been identified as TURCO decontamination solution.

    Volumes were calculated in the Track 1 Decision Documentation Package for this site.

17. Refer to State response #10.

18. Refer to EPA response #13.

19. During routine health physics survey of the drilling cores.

    There is only one sedimentary interbed and it starts at 117.7′ and extends to the total depth of the borehole at 122.9′.

    The total thickness of this interbed is unknown. The drilling was terminated in the interbed.

    The screened interval is from 93.1 to 113.1′.

    The top of the perched water is at 104′.

20. This information is provided in the "Hydrogeologic Study Report of the Tank Farm and CPP-33". This document was provided as part of background information for this operable unit. In the future, documents prepared will cite references that contain pertinent information.

21. Refer to responses # 19 and 20.

22. This information was included in the Technical Work Plan for the Idaho Chemical Processing Plant Drilling and Sampling Program at Land Disposal Units CPP-34 and CPP-55 which was submitted to EPA and State on November 21, 1990.

    All analytes except Magnesium and Potassium were requalified as estimates as a result of data validation. The re-qualification could be a result of a number of issues (matrix spike recovery, duplicate analysis relative percent difference, laboratory control sample, etc.) checked during data evaluation.

Rational for analyte selection is included in the technical work plan cited above.

23. This information was included in the "Report of the ICPP Drilling and Sampling Program at the HLLW Tank Farm and LDU CPP-33" which was submitted to EPA and State. The document was transmitted along with other background scoping material associated with OU 3-07.

24. Revision to the Draft SAP text is not being done.

Cesium was not detected during the first round of sampling but was detected in subsequent sampling and is being considered in the perched water. Yttrium is a daughter product of Sr-90 with a half life of 64 hours and is being considered as part of the SR-90 results.

The high calcium content shall be addressed in the Summary Report. The additional sampling which is to be done this field season will be used in the evaluation.

The Summary Report shall re-iterate that no specific source or process has been identified, related to the contamination encountered.

25. A revised figure is included in attachment A. The remaining comments, relating to the text, shall be addressed in future documents prepared.

26. Yes, slug tests will be performed during evaluation of existing data.

27. Refer to EPA Comment response #7.

28. As a result of additional guidance provided for Track 2 Risk Evaluations, the CSM has been revised and is included as attachment A to this addendum. The scenarios are presented in the discussion.

29. Refer to response to comment #28.

30. A revised figure is included in attachment A.

Yes, the liquids are the same as those mentioned in section 2.1.2.2.

The volumes could not be derived from the background information. The area was stabilized by spraying with water.

No background documentation exists on where the material was disposed of.

Refer to State Comment 6.

A general radiation area survey is conducted to determine the background levels.

31. Refer to State response #30.

Figure will be revised to show changes.

One sample was taken of the mud within the steam contamination release. No other soil samples were taken during excavation of the contaminated soil.

The impacts of the steam release have been addressed by WINCO's surface radiation cleanup program. Currently, there are no hot spots in the 14 acre release area. Therefore, the focus of this investigation is to place boreholes at the location where the liquid puddled. This area is within the tank farm area, and now has two feet of cover placed over the location.

32. A revised figure is included in attachment A.

33. Cr-144 should read Ce-144.

Reference DOE/ID-10340(91) is the Track 1 Guidance Document.

Risk calculations were performed for only those constituents in which analytical data was available. The risk screening calculations will be redone based on the new exposure scenarios. The new contaminants of concern

34. Refer to attachment B. A revised CSM has been prepared based upon new exposure scenario's.

35. Refer to attachment B. A revised CSM has been prepared based upon new exposure scenario's.

36. This is a combination of the 56 yd^3 of contaminated soil removed and the estimated 5 yd^3 of soil left in place.

Information is in Track 1.

The point that the levels were considered high radioactivity was not given in the background information. The levels currently in place are > 100 mR/hr but < 5 R/hr are considered high radiation levels.

Risk calculations were performed for only those constituents in which analytical data was available. The summary report will address metals and volatile organic compounds from a qualitative perspective since quantitative information cannot be obtained for these constituents.

37. Refer to attachment B. A revised CSM has been prepared based upon new exposure scenario's.

38. Based on our current background information 600 - 800 yd^3 of soil is contaminated. As additional information is collected this estimate may change.

Information is in Track 1 background information.

Agreed, risk values cannot be fully evaluated for metals, acids and organics by observation wells alone. However, samples for these constituents cannot be obtained due to the high radiation fields associated with the site.

The use of observation wells as an indicator of other contaminants is substantiated by the following:

Sections 2.1.3.3, 2.1.4.3, and 2.1.5.3 correspond to sites CPP-28, -31, and 32 respectively. These three sites were associated with a release of high level liquid waste. Typical HLLW is acidic and contains radionuclides, heavy metals and trace organics (tributyphosphate and hexone).

<u>Acids</u>: Because of the high buffering capacity of the soil at ICPP, when acids are released they will be neutralized by the calcium carbonate in the soil.

<u>Organics</u>: Prior to entering the lines in the tank farm, the HLLW is sent through a solvent recovery process. Due to this process, the liquid is expected to have trace quantities of tributyphosphate and hexone. Due to the length of time which has elapsed since the releases, approximately 16 to 18 years, these chemicals are not expected to be present in detectable quantities.

<u>Metals</u>: When the acidic HLLW is neutralized by the high carbonate content of the soil, the metals will precipitate out of solution and will complex with the carbonates to create salts and therefore limiting migration. Normally, metals will individually have a lower Kd values than radionuclides (ie faster migration rate), however, due to the complexing of the metals, the salts are not expected to migrate faster than the radionuclides. In addition, the driving force for migration (i.e. percolation) has been eliminated since 1978 when a synthetic membrane was placed over the entire tank farm. For these reasons, radiation readings from the probes are indicative of whether metals are present but not of the concentrations present. Due to this fact and that the probes will only detect gamma radiation, it is recommended that the probes will be used as indicators of whether contaminants are present but confirmatory samples will be collected and analyzed for COC in order to verify the probe readings. The confirmatory samples are expected to be taken at sites CPP-26 and -32. Due to the high radiation levels associated with CPP-28 and 31 samples cannot be taken. A list of COC are currently being re-evaluated given the new exposure scenarios and shall be transmitted by April 30, 1992.

Section 2.1.6.3 is associated with site CPP-79. All chemicals of concern listed in this section are scheduled to be sampled and analyzed. The list of analysis is presented in Table 3-2.

39. Data was presented in the Track 1 decision documentation package.

Refer to State response #38 (i.e. metals discussion).

During preparation of the site evaluation tables (i.e. tables 1 and 2), further information was obtained from the WINCO decontamination unit which clarified that the decontamination solutions used during the time period in question did not contain volatile organics. Therefore, based on this process knowledge, volatile organic compounds are no longer considered a contaminant of concern.

40. Recommendations for further action at this site shall be made in the Summary Report.

Refer to response #38 regarding the observation wells.

41. Sampling beyond the high radiation is not possible without penetrating through the high radiation areas.

42. Sampling will be done "if possible" as described in section 3.1.5. Only one probe can be placed due to the subsurface utilities.

43. Refer to attachment B. A revised CSM has been prepared based upon new exposure scenario's.

44. Refer to EPA response #13.

45. Refer to attachment B. Site CPP-32 has been included in the subsurface CSM.

46. Refer to response #38 regarding the observation wells.

One round of sampling shall be conducted for observation wells, monitoring wells and lysimeters.

Refer to response #38 regarding observation wells (i.e. metals discussion)

Clean up of surface contamination has been documented in the draft SAP. Since it's issuance, the two hot spots remaining in the area have been cleaned up. This will also be documented in the Summary Report.

CPP-28:	Refer to response #38.
CPP-31:	Refer to response #38.
CPP-32E:	Sampling will be done "if possible" as described in section 3.1.5.

CPP-79 Sampling will be done "if possible" as described in section 3.1.5. Only one probe can be placed due to the subsurface utilities.

Single point observation wells shall be used to determine the vertical extent of contamination and to determine whether contaminants still exist at the site.

For geotechnical studies, refer to response to EPA comment #12.

For Well 55-06, the groundwater analysis shall be used to evaluate current conditions at the site. In addition, the analysis shall support future investigations relating to the site wide perched water zone(s).

The groundwater monitoring plan (GWMP) is in draft and cannot be issued in draft form. Those sections of the GWMP which have been referenced in the draft SAP include sampling procedures and QA/QC. Attachment C of this addendum contains the sampling procedures and the DQO form for site 55-06. The DQO form specifies appropriate QC samples.

The risk levels designated are based on the Track 1 Guidance Document (DOE/ID-10340(91), Table 2.

47. The risk levels designated are based on the Track 1 Guidance Document (DOE/ID-10340(91), Table 2.

Critical samples are listed on the DQO forms provided in Appendix A.

Gamma Spectroscopy should be analytical level III.

48. Refer to response #46.

The need for background samples shall be included in the SAP for OU 3-08.

Refer to State Comment 6 and Track 1 for information on the sampling event.

The title of Appendix C, Track 2 Guidance Document is titled "Risk Assessment Methodology" and uses both risk assessment and evaluation interchangeably. All future documents shall use the term "Qualitative Risk Evaluation".

In the future, references to recommended actions will only be included in the Summary Report.

49. The observation well is currently planned to be advanced below the contaminated zone.

As stated in the draft SAP, additional probes will be installed to determine the extent of contamination. Recommendations for further action would the be included in the Summary Report.

Grab samples will not be composited.

50. The x-coordinate and y-coordinate represent latitude and longitude, respectively.

51. The date the observation wells were plugged and abandoned cannot be determined from the historical file.

A single observation well will only determine vertical migration.

Refer to response #38.

52. Future use of this figure shall have associated text which indicates that section A-A' represents an east-west cross section of the site.

All wells are shown in the lower left hand box inset. This inset is sufficient to reflect a spatial relationship between well locations.

53. As described in the text of the SAP in Section 3.1.3.1, the isopleth map on Figure 3.3 shows an extrapolated 30 R/hr boundary at the center of radiologic contamination. Current data was used to prepare the map. This projected 30 R/hr boundary is estimated.

Per conference call discussions, the revised Figure 3-3 and tabular format for the data will be deferred to the Summary Report.

Refer to response #38.

54. The reference to interim action and associated risk in this section is listed as an item to be evaluated as dictated by the FFA/CO. Refer to flow chart for the Track 2 process. Site CPP-32 east is expected to be located under 1 to 2 feet of clean soil. The radioactivity at CPP-32 east would not be detected by a surface rad survey. Provided that risk is determined for subsurface materials down to 3 meters below ground surface (15 feet at the time of SAP preparation), there may be sufficient risk to justify an interim action.

55. Refer to EPA response #1 and State response #38.

56. Not applicable

57. Not applicable

58. Only the vertical extent of contamination will be determined.

59. Investigating CPP-79 during the RI/FS would allow a detailed review of available options for investigating the site (i.e. trenching, shoring, caissons, etc.). The limitations of the Track 2 investigation do not allow for the detailed study and investigation necessary to pursue innovative investigation and remediation technology for use at the site.

As currently planned, the analyses for the soil boring at CPP-79 will be limited to chemical and radiologic parameters, if possible. Geophysical samples will be collected as necessary during the RI/FS to aid in completion of the feasibility study.

60. Drilling and sampling the basalt beneath site CPP-79 will be determined in the field based on the results of the "observation well" radiologic monitoring. If radiologic monitoring shows that contamination extends to the basalt, sampling may be performed.

Should high levels of radioactivity be present and it is not possible to collect additional samples, the decision for additional action at the site will be based on radiologic data alone.

61. The groundwater monitoring plan (GWMP) is in draft and cannot be issued in draft form. Those sections of the GWMP which have been referenced in the draft SAP include sampling procedures and QA/QC. Attachment C of this addendum contains the sampling procedures and the DQO form for site 55-06. The DQO form specifies appropriate QC samples.

For Well 55-06, the groundwater analysis shall be used to evaluate current conditions at the site. In addition, the analysis shall support future investigations relating to the site wide perched water zone(s).

Since the extent of the perched zone is to be evaluated further under the Comprehensive RI, it is considered appropriate to require level III quality data until such time that the significance of the well 55-06 location is determined.

62. Refer to EPA response #13.

Critical samples are included in the DQO form for site 55-06 in Appendix A of the draft SAP.

For Well 55-06, the groundwater analysis shall be used to evaluate current conditions at the site. In addition, the analysis shall support future investigations relating to the site wide perched water zone(s).

In the future, recommendations for further actions will be included in the Summary Report.

62. The groundwater monitoring plan (GWMP) is in draft and cannot be issued in draft form. Those sections of the GWMP which have been referenced in the draft SAP include sampling procedures and QA/QC. Attachment C of this addendum contains the sampling procedures and the DQO form for site 55-06. The DQO form specifies appropriate QC samples.

Refer to response to EPA comment #13.

63. Details regarding the existing wells to be used in this investigation were provided in the "Hydrogeologic Study Report of the Tank Farm and CPP-33". This document was provided as part of background information for this operable unit. In the future, documents prepared will cite references that contain pertinent information.

64. Stainless steel pipe is required due to the corrosivity of the high level waste in the tank farm area. RTV stands for Room Temperature Vulcanizing (RTV) silicone. Refusal occurs when the stainless steel observation well will cannot be driven any farther than the pipes maximum capacity or when the top of the basalt is encountered at an earlier interval.

65. WINCO SOP 3.26 is a procedure that is used to explain steps to be followed when monitoring the "observation wells".

Water that is evacuated from the "observation wells" will be sent to WINCO Laboratories for chemical and radiological analysis.

The results for the water from the laboratory will determine what the final disposition of the liquid will be.

The radiation survey meters used are capable of detecting beta/gamma and gamma.

The minimum levels the instruments can detect are background levels.

A radiation shielding multiplier is not applied to the results recorded during the survey.

66. References to soil cores will be substituted with soil samples in the summary report. Historically, sampling at the ICPP has been accomplished by driving the split-spoon sampler ahead of the hollow stem auger. If the sampler is pushed ahead of the auger, hydraulic pressures will be recorded assuming the rig is equipped with the appropriate equipment.

Labs will be determined based on availability at the time of shipment. EG&G is preparing to contract a number of laboratories to perform analyses. WINCO will utilize the same laboratories.

Metals analyses will be performed using the method selection worksheet which specifies between AA/ICP.

Sections 4.2.1.3 t and u should have read that above 500mR samples will not be taken. The current language exists due to earlier drafts of the plan when the WINCO laboratory was being considered due to the high rad levels. Due to facility access problems, the laboratory cannot be used.

The field methods for determining soil textural and physical properties described on page 59, item p, are based on the observations of the DPE/PG and approximate the ASTM laboratory methods. Methods described on page 60, item v, will be tested in the laboratory using ASTM methods.

67. Refer to response to comment #66.

68. Metals analyses will be performed using AA methods when matrix interferences are anticipated and for specific metals of concern.

69. This information is provided in the "Hydrogeologic Study Report of the Tank Farm and CPP-33". This document was provided as part of background information for this operable unit. In the future, documents prepared will cite references that contain pertinent information.

70. The equipment blank frequency is in Appendix A. The correction will not be made since the draft SAP text is not being revised.

71. Reference to OU 3-08 is a typographical error. Operable unit 3-07 should have been referenced.

    Effervescence in hard water may be a problem when preserving a sample for volatile organic compounds analysis. It is not a problem for OU-07 however, because no aqueous samples are being analyzed for volatile organic compounds.

    The USGS was contacted with regard to carbonates in groundwater which could cause effervescence when acids are added. Based upon the discussion the USGS personnel stated that there are not sufficient carbonates in the water to cause effervescence.

72. While the regulatory limit on radioactivity might change in the DOT regulations, it is not anticipated that the methods for detecting radioactivity will change.

73. There is a six month maximum holding time required for gamma scans.

74. The DQO forms will be revised based upon contaminants of concern currently being evaluated using new exposure scenarios. A list of C of C's shall be transmitted April 30, 1992.

75. Level IV quality data and verification will be performed on all critical samples and trip blanks will be collected.

76. Refer to response #75.

77. Refer to response #75.

78. Refer to response to Comment #62.

79. Refer to response to Comment #62.

80. The SOP's referred to in Appendix B are laboratory SOP'S for analyses of Uranium 234, 235, 238 and Americium 241. The specific SOP's have been included on the method selection sheets.

81. No response necessary.

ATTACHMENT A

Revised Conceptual Site Model

1.0 CONCEPTUAL SITE MODEL

The following sections discuss the conceptual site model (CSM) and contaminants of concern for the various types of release sites within OU 3-07. The CSM was developed based upon screening techniques being developed for the track 2 Guidance Document. For the purposes of the Track 2 process, the following scenario's are considered in the development of the CSM: 1) Future Residential and 2) Current Occupational. The future residential assumes that a resident resides within the site boundary and eats, drinks, places a basement down to a depth of 3 meters and installs a groundwater well at the site boundary in 100 years. The occupational scenario is to be developed based upon site specific information. For the Tank Farm it is assumed that occupational workers will have access to the site and are free to walk over the areas of concern. In addition, it is assumed that due to the existence of a synthetic membrane and cover, the employees will not easily penetrate the membrane layer (2 feet bls). Therefore, intrusion is assumed to be to a two foot level and above the membrane.

1.1 Surface Release Site

1.1.1 Conceptual Site Model

The conceptual site model for the surface release at CPP-26 is provided in Figure 2-5. As shown, the pathways for contaminant migration from the site are air, soil and groundwater.

Airborne contamination from CPP-26 has the potential for human exposure through ingestion, skin contact, and inhalation to future residents. The risk is driven by the fact that a basement will be placed to a depth of 3 meters. At this depth, residents are directly exposed to existing contaminants. The more distant the receptor is from the site, the lower the resultant risk. Due to the long half lives of the contaminants involved, future receptors will be considered in the site model. Current occupational workers are assumed to be exposed to the upper 2 feet of soil. Since the contaminants are below this level within the tank farm, a break in the pathway occurs. As previously discussed in the draft SAP, dated February 28, 1992, locations outside the tank farm area have either been excavated due to construction activities since the time of the release or hot spots have been cleaned up as part of the ICPP surface rad clean up project. Therefore, a break in the pathway also occurs for those areas located outside the tank farm boundary.

Storm water runoff has the potential to spread contamination and generate surface water and sediment pathways. However, two feet of fill and a synthetic membrane was placed over the entire tank farm area in 1976. As a result, any residual surface contamination would not be expected to exist at current surface levels. In addition, as previously discussed in the draft SAP, dated February 28, 1992, locations outside the tank farm area have either been excavated due to construction activities since the time of the release or hot spots have been cleaned up as part of the ICPP surface rad clean up project. Therefore, a break in the pathway also occurs for those areas located outside the tank farm boundary.

Groundwater beneath the site is used for drinking water and is obtained from wells in the general area. The drinking water being used meets drinking

Tank Farm - Conceptual Site Model
Surface Releases

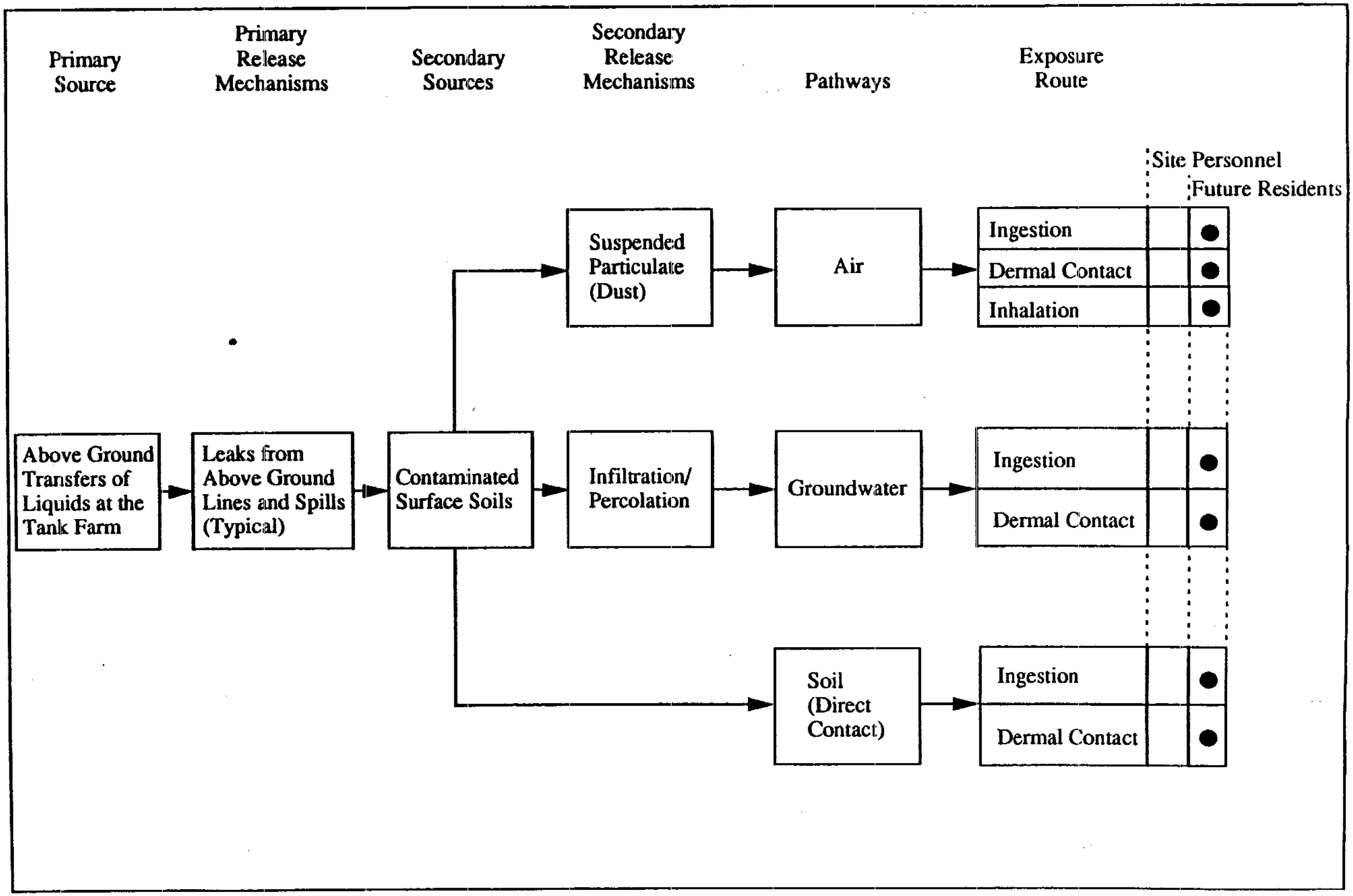


Figure 2-5. Surface Release Sites Conceptual Site Model.

M2W073 4/20/92

water requirements and no risk exists to current occupational workers. The largest hypothetical risk through groundwater is believed to be to future residents installing drinking water wells at or near the point of contamination. Using GW Screen as the model for predicting transport of contaminants to the aquifer, the potential risk via this pathway is only present for chromium, molybdenum, and boron. All other constituents either do not reach groundwater within 1000 years or the transit times exceed five times the half lives.

Assumptions used in the modeling of the contaminants to the groundwater include:

* that contaminant transport is the result of plug transport with no contaminant dispersion of the plume taking place.

* Radionuclides decay as a result of the time required for the contaminants to reach groundwater.

* Using the interbed thickness as the effective depth between the contaminants at the surface and the groundwater (ie. that contaminant transport through the basalt is only due to secondary fractures in the basalt).

* The effective interbed thickness used in the model was 20 meters.

1.2 Subsurface Release Sites

1.2.1 Conceptual Site Model

The subsurface release sites include CPP-28, -31, -32 East and -79. The conceptual site model for subsurface release sites, Figure 2-7, is very similar to that for surface releases. Using the same exposure assumptions, a break occurs in the surface water and sediments pathway. In addition, risks via the soil and air pathways are driven by direct exposure to contaminants during installation of a basement in the future residential scenario.

The other mechanism for release of contamination from subsurface release sites is through infiltration/percolation to the ground water. Discussion of this mechanism and pathway is identical to that provided for the surface release sites.

1.3 Perched Water Zone (Well 55-06)

1.3.1 Conceptual Site Model

The conceptual site model for contamination in the perched water, as defined in well 55-06, is provided in Figure 2-8. The pathway of concern is the deeper ground water of the Snake River Aquifer that is used as a drinking water source.

Tank Farm - Conceptual Site Model
Subsurface Releases

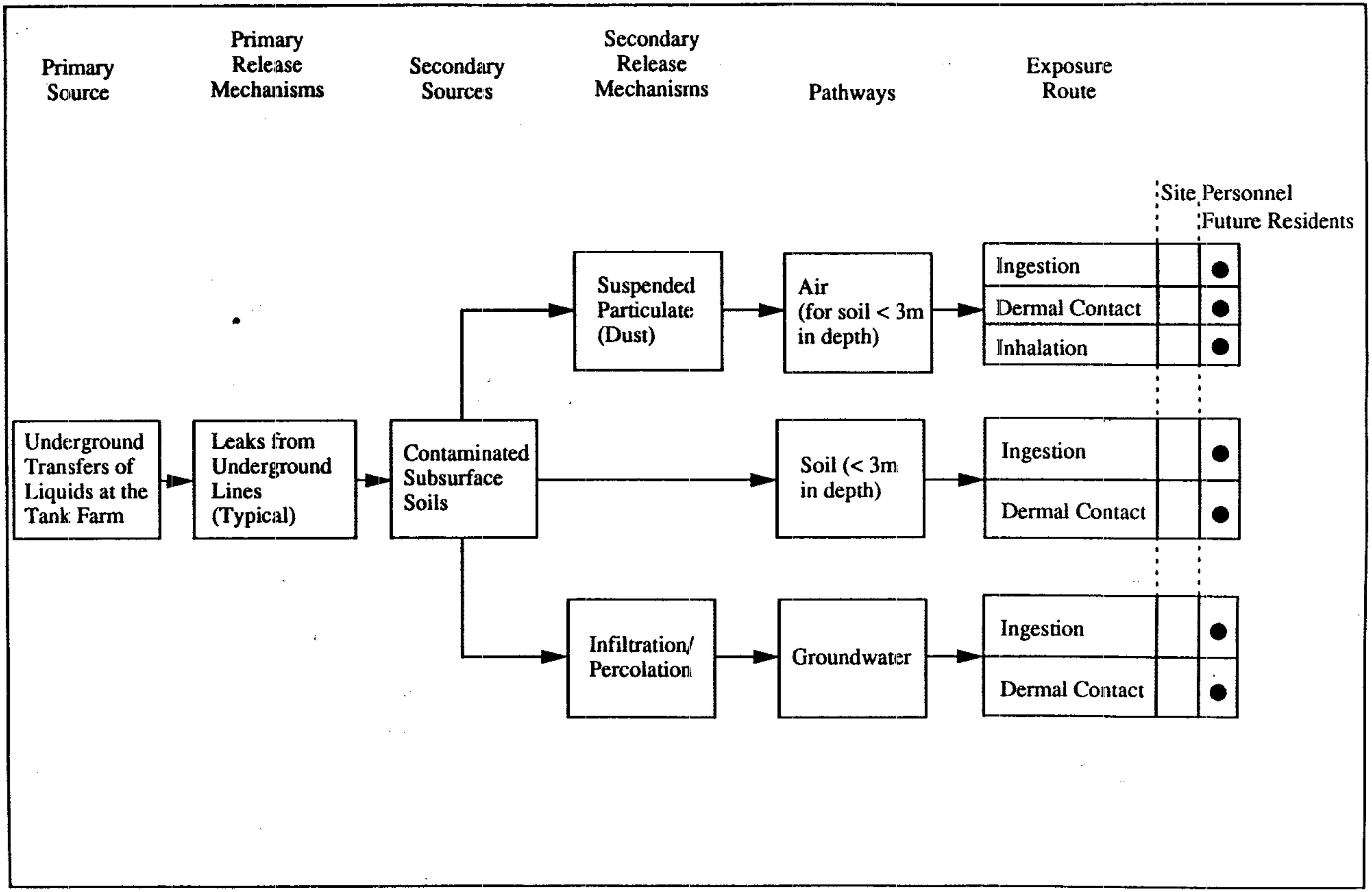


Figure 2-7. Subsurface Release Sites Conceptual Site Model.

M2W075 4/20/92

Tank Farm - Conceptual Site Model
Perched Water Contamination

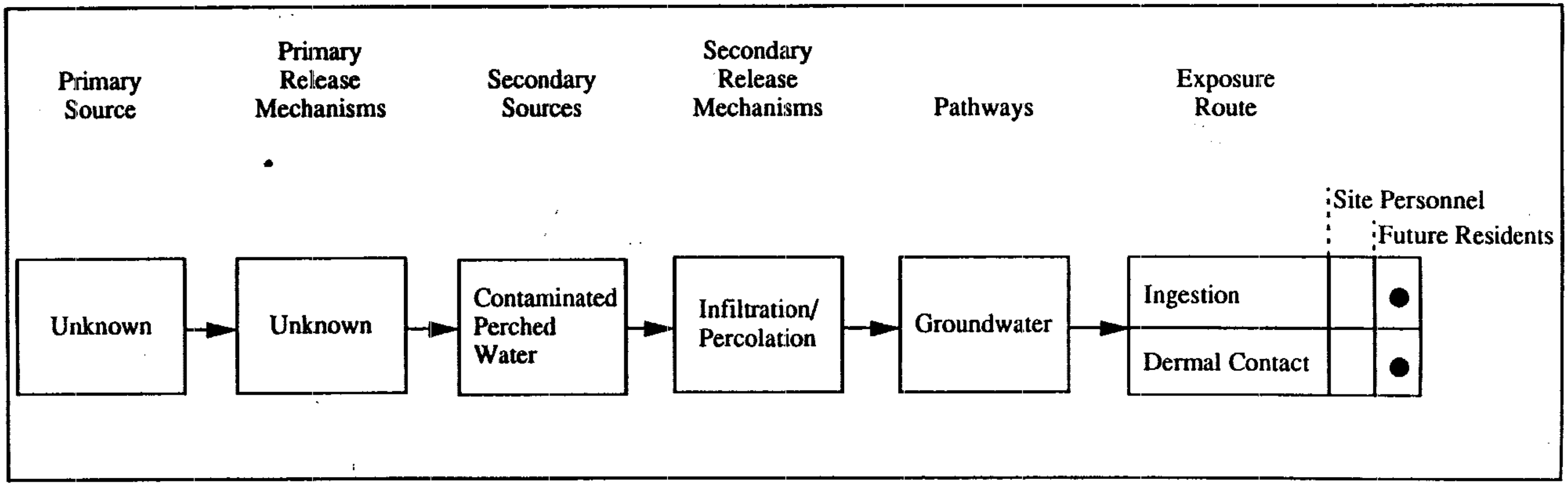


Figure 2-8. Perched Water Contamination Conceptual Site Model.

M2W074 4/20/92

For perched water to exist at the ICPP, there must be non- or less permeable zones in the basalt lying below the perched water. However, the secondary horizontal fractures in the basalt are known to have a high permeability, but the present and long-term ability of the less permeable zones to perch water and keep it from moving is unknown. Since the site 55-06 is defined as the perched water at the well location, and the entire perched water will be evaluated in the future, the pathways will not be fully evaluated at this time.

ATTACHMENT B

REVISED FIGURES

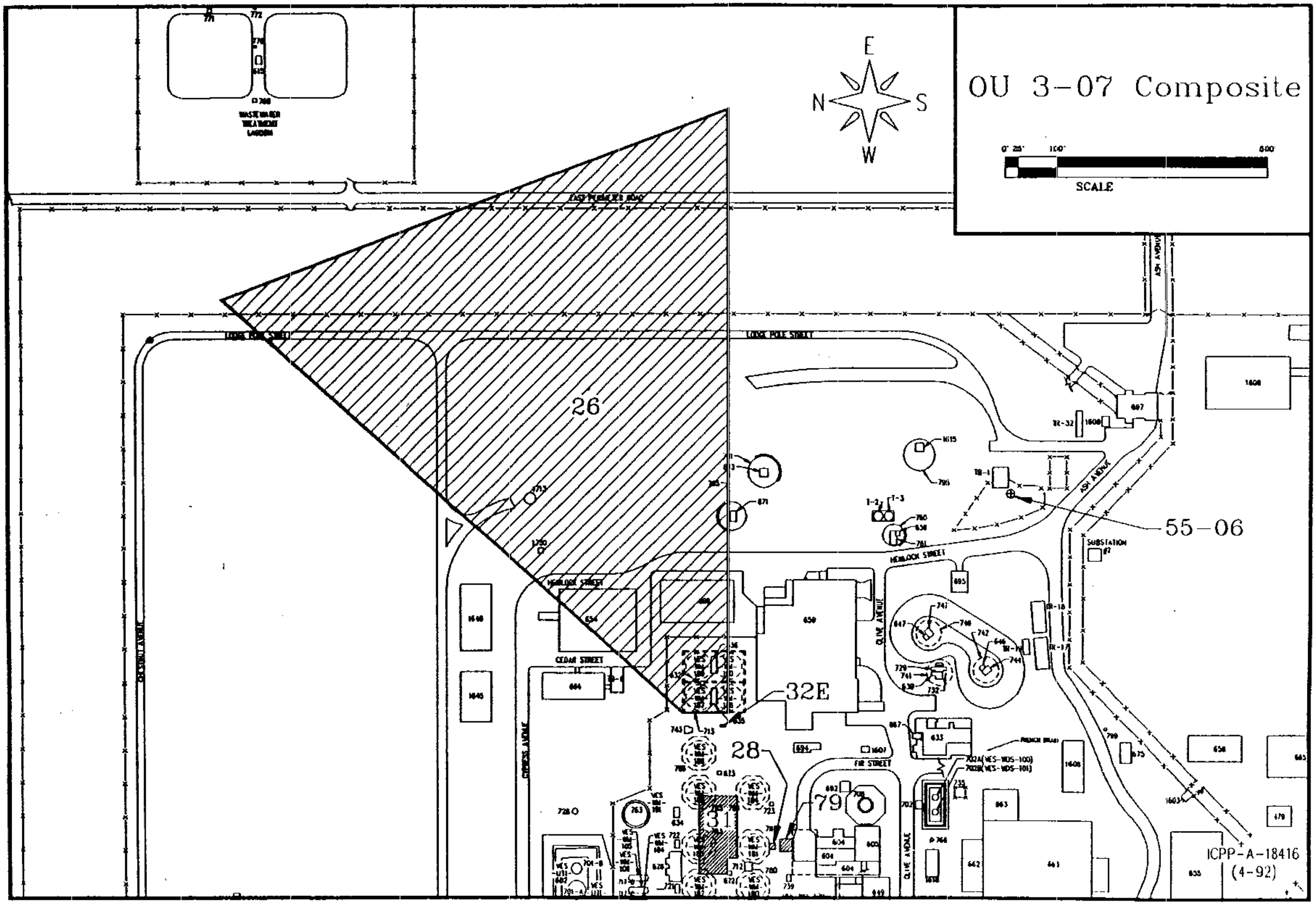

OU 3-07 Composite
E
N
S
W
SCALE
EAST PERIMETER ROAD
LODGE POLE STREET
HEMLOCK STREET
CEDAR STREET
FIR STREET
CYPRESS AVENUE
OLIVE AVENUE
ASH AVENUE
SUBSTATION
26
55-06
32E
28
79
31
ICPP-A-18416
(4-92)

Figure 2-1

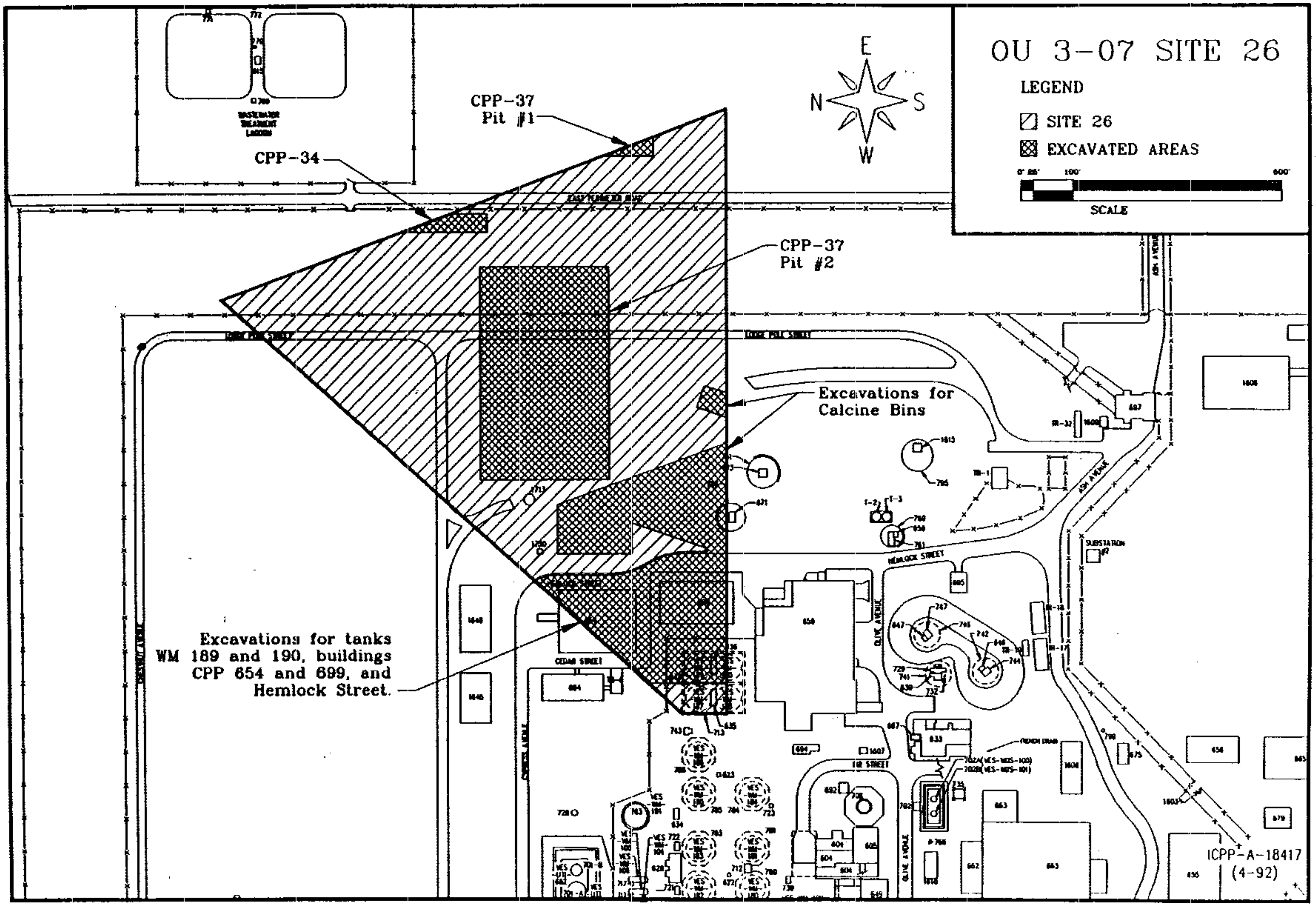

OU 3-07 SITE 26
LEGEND
SITE 26
EXCAVATED AREAS
SCALE
E
N
S
W
CPP-37
Pit #1
CPP-34
CPP-37
Pit #2
Excavations for
Calcine Bins
Excavations for tanks
WM 189 and 190, buildings
CPP 654 and 699, and
Hemlock Street.
HEMLOCK STREET
CEDAR STREET
OLIVE AVENUE
FIR STREET
SUBSTATION
ICPP-A-18417
(4-92)

Figure 2-6

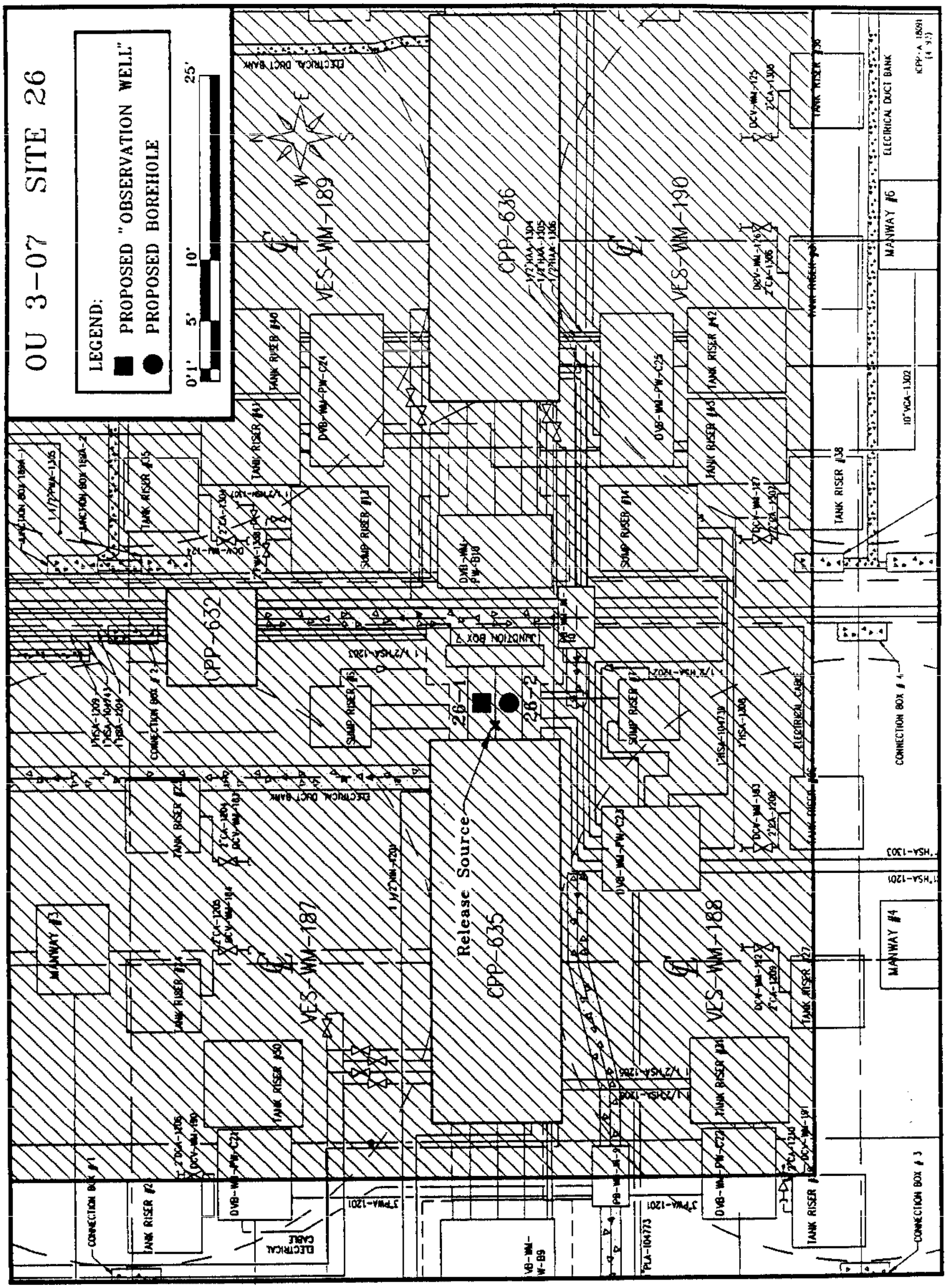
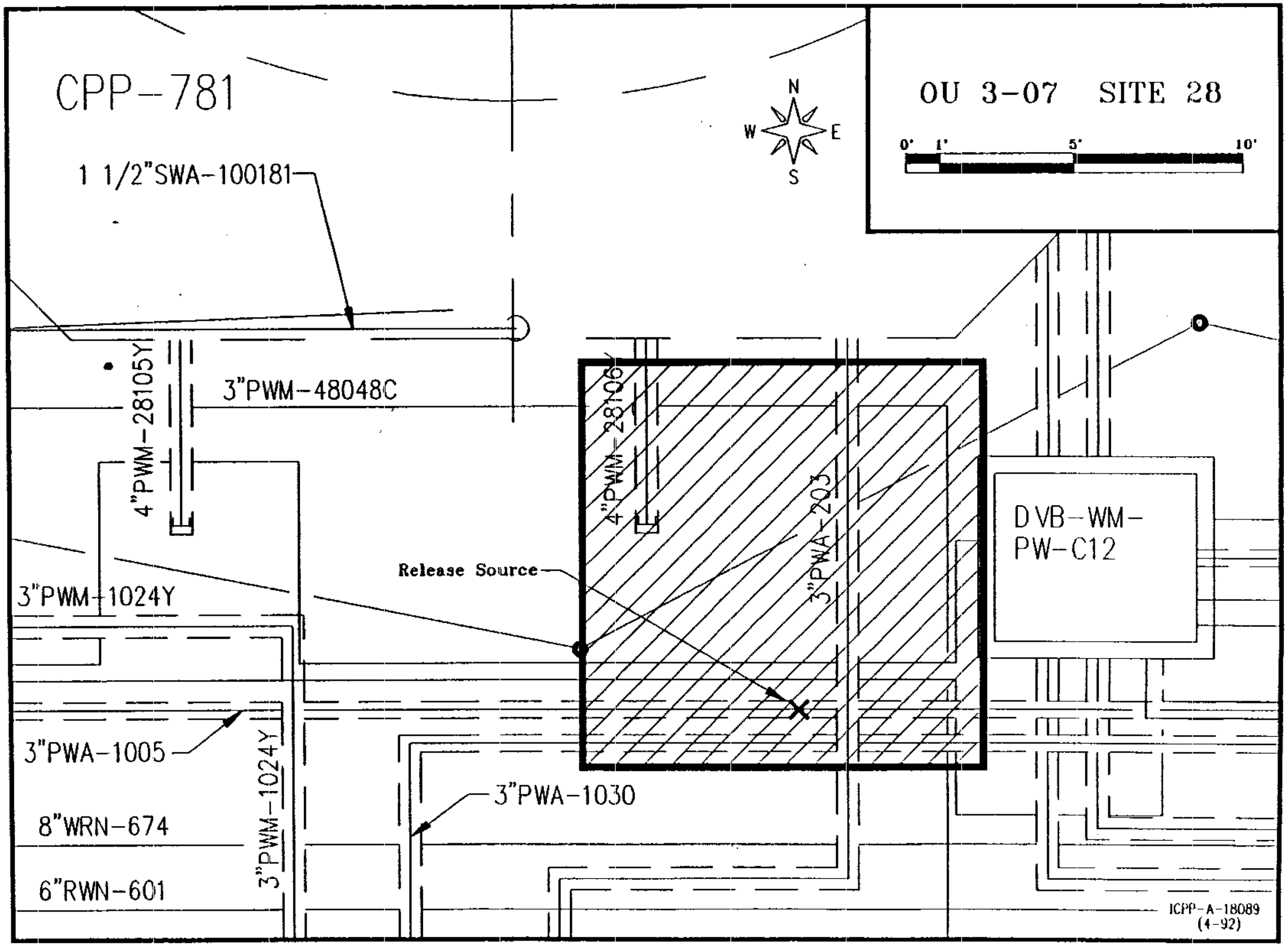
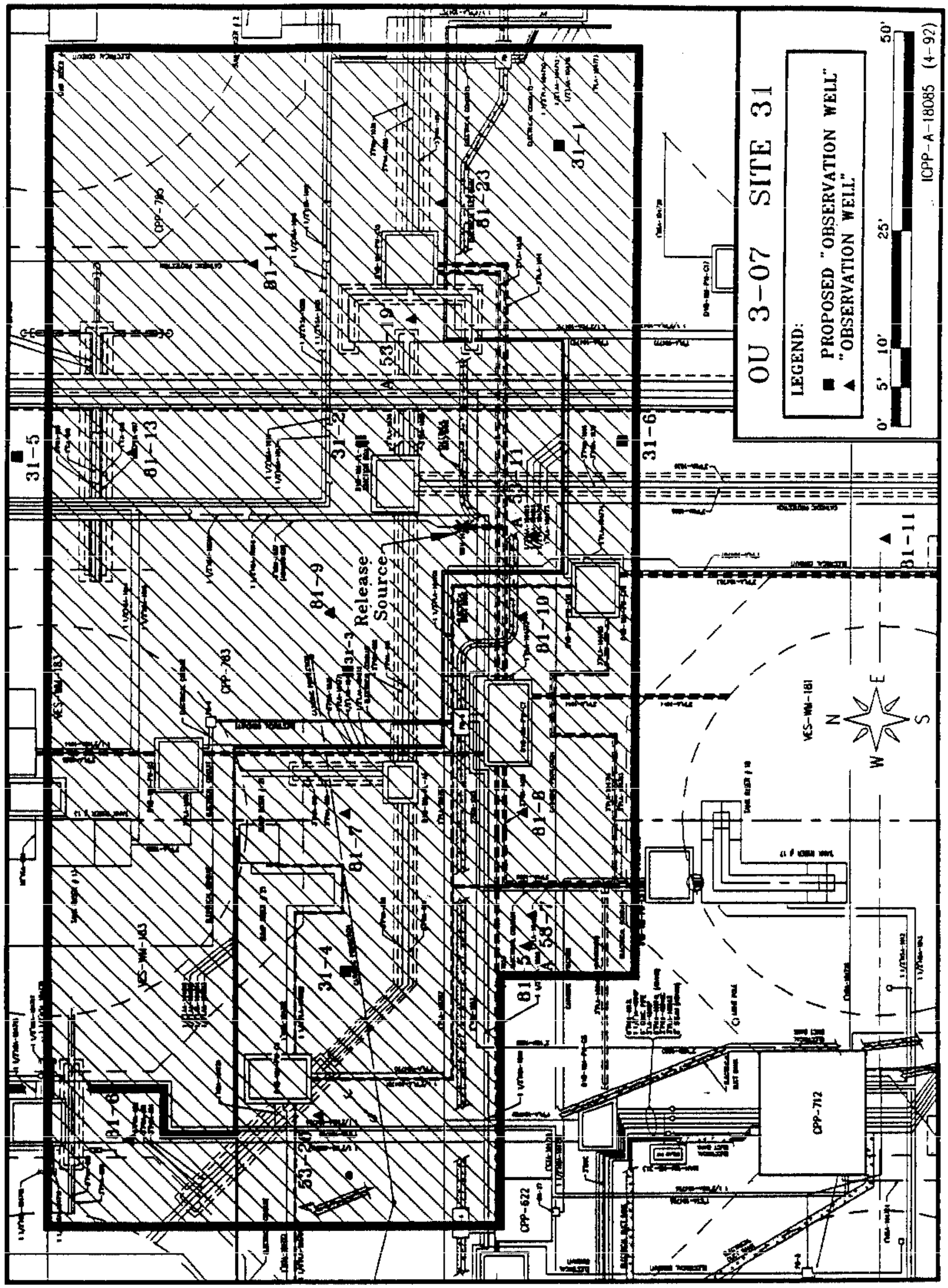

OU 3-07 SITE 26
LEGEND:
PROPOSED "OBSERVATION WELL"
PROPOSED BOREHOLE
0'1' 5' 10' 25'
CPP-636
CPP-635
CPP-632
Release Source
26-1
26-2
VES-WM-187
VES-WM-188
VES-WM-189
VES-WM-190
JUNCTION BOX 7
ELECTRICAL DUCT BANK
MANWAY #3
MANWAY #4
MANWAY #6
CONNECTION BOX # 1
CONNECTION BOX # 2
CONNECTION BOX # 3
CONNECTION BOX # 4
TANK RISER #2
TANK RISER #38
SUMP RISER #13
SUMP RISER #14
ELECTRICAL CABLE

Figure 3-1

Figure 3-2


OU 3-07 SITE 28
0' 1' 5' 10'
N
W
E
S
CPP-781
1 1/2"SWA-100181
4"PWM-28105Y
3"PWM-48048C
4"PWM-28106
3"PWA-203
DVB-WM-PW-C12
Release Source
3"PWM-1024Y
3"PWA-1005
8"WRN-674
6"RWN-601
3"PWM-1024Y
3"PWA-1030
ICPP-A-18089
(4-92)



OU 3-07 SITE 31
LEGEND:
PROPOSED "OBSERVATION WELL"
"OBSERVATION WELL"
0' 5' 10' 25' 50'
ICPP-A-18085 (4-92)
Release Source
CPP-763
CPP-712
CPP-622
31-1
31-2
31-3
31-4
31-5
31-6
81-7
81-9
81-10
81-11
81-13
81-14
81-23
N
E
S
W

Figure 3-6

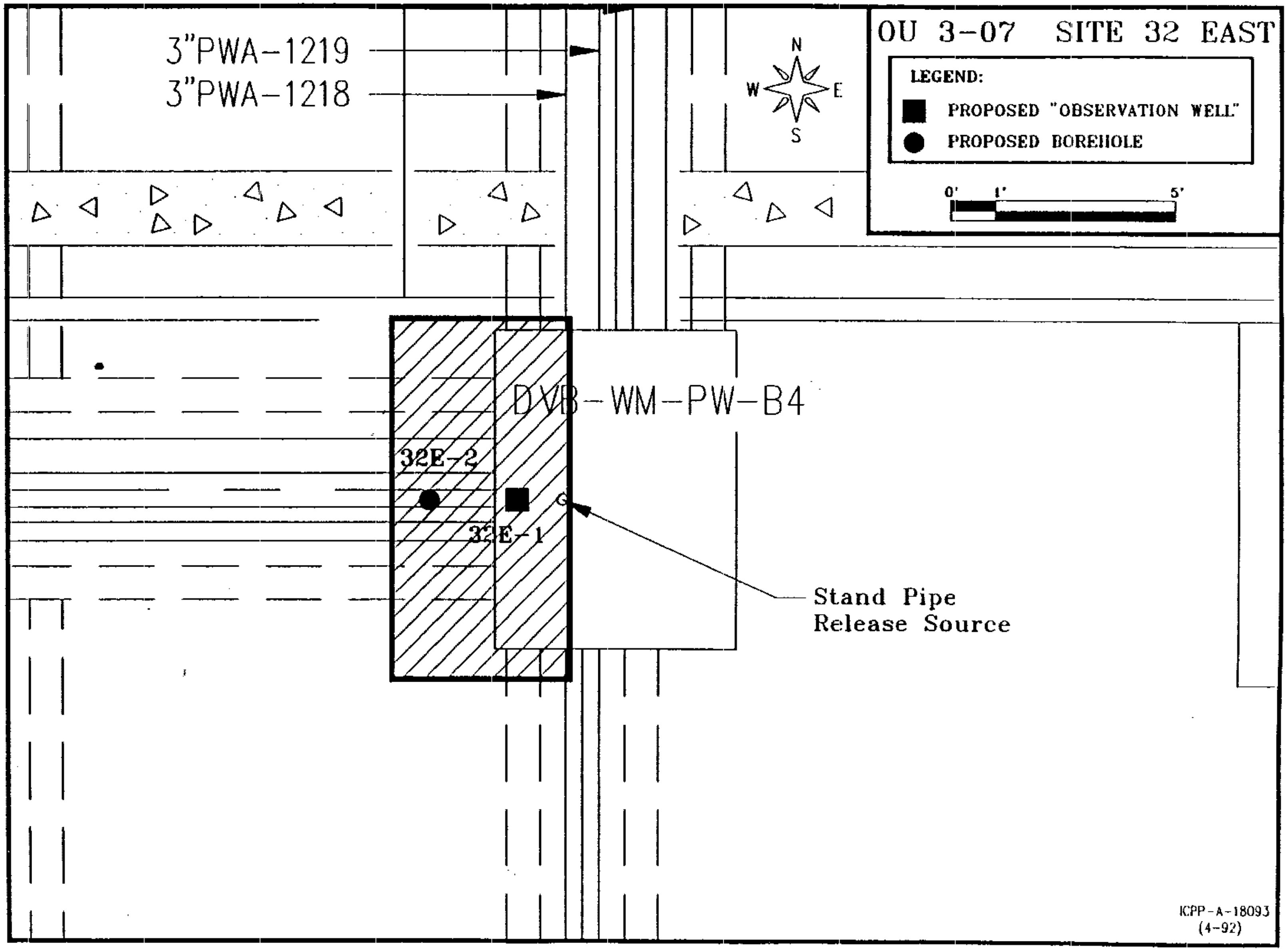

OU 3-07 SITE 32 EAST
LEGEND:
PROPOSED "OBSERVATION WELL"
PROPOSED BOREHOLE
0'
1'
5'
N
S
E
W
3"PWA-1219
3"PWA-1218
DVB-WM-PW-B4
32E-2
32E-1
Stand Pipe
Release Source
ICPP-A-18093
(4-92)

Figure 3-7

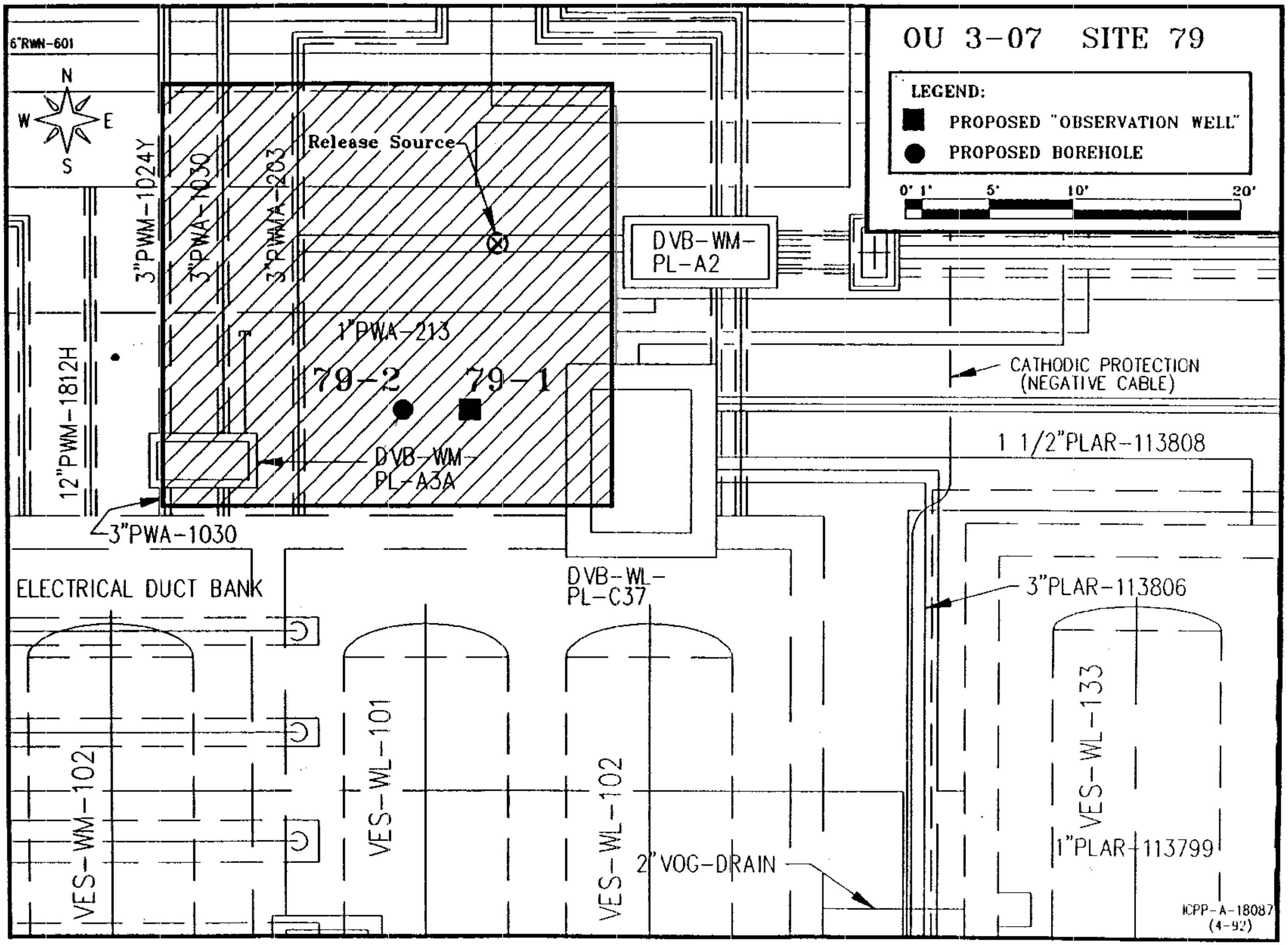
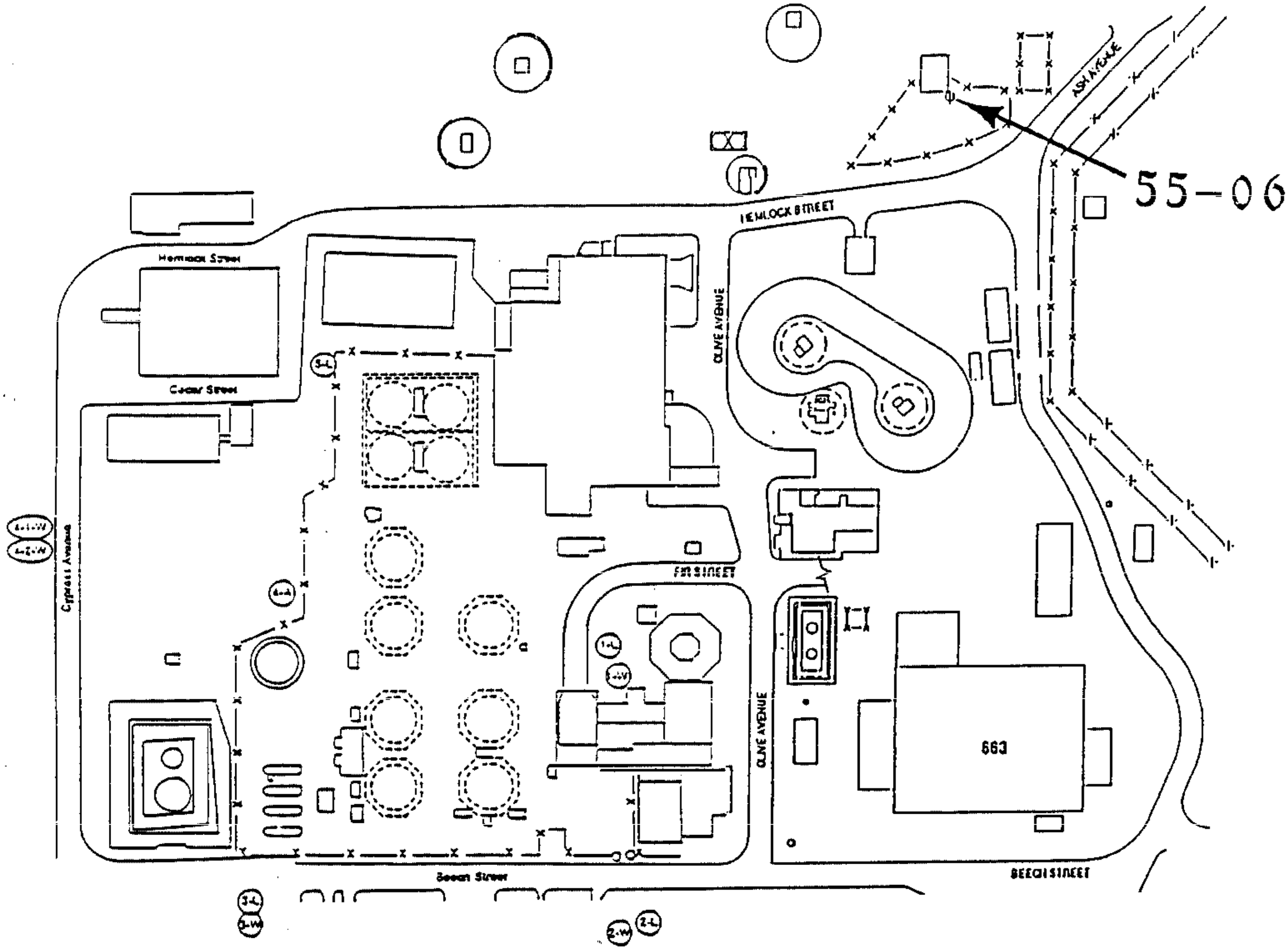

OU 3-07 SITE 79
LEGEND:
PROPOSED "OBSERVATION WELL"
PROPOSED BOREHOLE
0' 1' 5' 10' 20'
6"RWN-601
N
W
E
S
Release Source
3"PWM-1024Y
3"PWA-1030
3"PWA-203
1"PWA-213
79-2
79-1
DVB-WM-PL-A2
CATHODIC PROTECTION (NEGATIVE CABLE)
1 1/2"PLAR-113808
12"PWM-1812H
DVB-WM-PL-A3A
3"PWA-1030
ELECTRICAL DUCT BANK
DVB-WL-PL-C37
3"PLAR-113806
VES-WM-102
VES-WL-101
VES-WL-102
2"VOG-DRAIN
VES-WL-133
1"PLAR-113799
ICPP-A-18087 (4-92)

Figure 3-8



EXPLANATION

- (1W) Site 1, monitoring well with screen from 89.0 to 99.0 feet
- (1L) Site 1, lysimeter installed at 28.4 feet
- (2-W) Site 2, monitoring well with screen from 85.8 to 105.8 feet
- (2-L) Site 2, lysimeter installed at 41.0 feet
- (3-W) Site 3, monitoring well with screen from 111.8 to 121.8 feet
- (3-L) Site 3, lysimeter installed at 42.7 feet
- (4-A) Site 4A, borehole abandoned with cement grout
- (4-1-W) Site 4, monitoring well with screen from 98.2 to 118.2 feet
- (4-2-W) Site 4, monitoring well with screen from 20.5 to 30.5 feet
- (5-L) Site 5, lysimeters installed at 33.7 feet and 112.5 feet

0 200
FEET

Figure 3-9

LOCATION OF TANK FARM WELLS AND LYSIMETERS
INEL/ICPP TANK FARM

TABLE 2-1

CPP-28 OBSERVATION WELL RADIATION READINGS

(mR/hr)

	OBSERVATION WELLS										
Elevation	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11
0'-0"					30						
(-) 1'-0"	35				35	25	20	40	10	40	40
(-) 2'-0"	35	50	25	60	50	30	15	50	40	40	40
(-) 3'-0"	35	50	25	70	60	35	6	70	40	40	50
(-) 4'-0"	35	50	25	100	60	70	2	80	40	50	60
(-) 5'-0"	30	50	25	150	70	200	3	100	40	60	50
(-) 6'-0"	7	200	18	200	60	250	10	350	12	90	150
(-) 7'-0"	7	1,500	3	1,500 5,500 35,000	100	150	10	2,000 7,000 12,000	8	350	5,000
(-) 8'-0"	7	300	2	20,000 3,000	2,000	40	10	90,000 65,000	8	11,000 50,000	11,000
(-) 9'-0"	50	60	1	800	50	20	50	10,000 1,000	6	4,000	250
(-)10'-0"	40	5	0.6	100	20	4	250	12		50	10
(-)11'-0"	20	5	0.5	10	50	1	50	4	<5	7	2
(-)12'-0"	10	1.5	<0.5	6	50	<1	12	2		1	<1
(-)13'-0"	10	1.0		3	60			1	<1	<1	
(-)14'-0"		<0.5		2	2			<1			
(-)15'-0"				1	1						

Note: Pipe encasement is at elevation (-) 7'-0".

ATTACHMENT C

GROUNDWATER SAMPLING PROCEDURE

DQO SUMMARY FORM

1. SITE

NAME OU 3-07
LOCATION CPP-55, Tank Farm Wells
NUMBER 55-06

EPA
REGION X
PHASE I
T1 T2 RI1 RI2 RI3 ERA FS RD RA
(CIRCLE ONE)

2. MEDIA (CIRCLE ONE): SOIL | GW | SW/SED | AIR | BIO | OTHER ________

3. USE (CIRCLE ALL THAT APPLY): SITE CHARAC. (H&S) | RISK ASSESS. | EVAL. ALTS. | ENG'G DESIGN | PRP DETER. | MONITORING REMEDIAL ACTION | OTHER ________

4. OBJECTIVE Determine the current groundwater quality of the site.

5. SITE INFORMATION
AREA Unknown DEPTH TO GROUND WATER Aquifer 450'; Perched @ 100'
GROUND WATER USE Aquifer - potable; Perched - none
SOIL TYPES Alluvium - (gravel, sand, silt)
SENSITIVE RECEPTORS Occupational workers and residential 100 year scenario

6. DATA TYPES (CIRCLE APPROPRIATE DATA TYPES)

A. ANALYTICAL DATA

pH	PESTICIDES	TOX
CONDUCTIVITY	PCB	TOC
VOA	METALS	BTX
ABN	CYANIDE	COD
TCLP	RADIONUCLIDES	GENERAL MINERALS

B. PHYSICAL DATA

PERMEABILITY	HYDRAULIC HEAD
POROSITY	PENETRATION TEST
GRAIN SIZE	HARDNESS
BULK DENSITY	

7. SAMPLING METHOD (CIRCLE METHOD(S) TO BE USED)

ENVIRONMENTAL | BIASED | GRAB | NON-INTRUSIVE | PHASED
SOURCE | GRID | COMPOSITE | INTRUSIVE

8. ANALYTICAL LEVELS (INDICATE LEVEL(S) AND EQUIPMENT & METHODS)

LEVEL 1 FIELD SCREENING - Beta/Gamma and Alpha radiation detectors, pH, conductivity, temp.
LEVEL 2 FIELD ANALYSIS -
LEVEL 3 NON-CLP LABORATORY - See method selection summary forms
LEVEL 4 CLP/RAS -
LEVEL 5 NON STANDARD

9. SAMPLING PROCEDURES
BACKGROUND -
CRITICAL - N/A
PROCEDURES - As specified in Attachment C of Draft SAP Addendum

10a. QUALITY CONTROL FIELD SAMPLES

REPLICATE - 5%
FIELD BLANK - N/A
TRIP BLANK - 1 per VOA ice chest
EQUIPMENT BLANK - N/A, sampling equipment is dedicated to well location.

10b. QUALITY CONTROL LABORATORY SAMPLES

REAGENT BLANK - 1 per analysis batch
REPLICATE - 1 per analysis batch
MATRIX SPIKE/DUPLICATE - 1 per analysis batch
QUALITY CONTROL REFERENCE SAMPLES - 1 per analysis batch
PERFORMANCE AUDIT SAMPLES - 1 per analytical method per laboratory or laboratory approval per QAPjP, section 12.

GROUNDWATER FIELD SAMPLING PLAN
FOR THE
IDAHO CHEMICAL PROCESSING PLANT

Prepared for
Westinghouse Idaho Nuclear Company, Inc.
Idaho Falls, Idaho

Prepared by
Golder Associates Inc.
Richland, Washington

May 1991

5. SAMPLING PROCEDURES ON SITE

Prior to sampling, field personnel shall review the Well Information Sheets for wells from which the samples are to be drawn. Information to be obtained from the sheets should include: 1) the required level of personnel protection necessary to perform the sampling; 2) the analytes for which the sample is being taken; and 3) any additional equipment that may be required to perform the sampling. Next, the non-dedicated sampling equipment shall be inspected to ensure proper decontamination (Section 5.2). Upon meeting health and safety requirements, the well head is checked for the presence of volatile organic compounds (VOCs) with one of the environmental monitoring instruments identified in Section 5.3. Subsequent to monitoring for VOCs, a water level measurement will be taken (Section 5.4), and it shall be determined at this point if an immiscible layer is present in the well. If the presence of an immiscible layer is detected, a bailer will be used and a sample of the layer will be obtained (Section 5.5). Well purging activities will then be conducted (Section 5.6) after determining the purge volume and purge water containment requirements. The rate of discharge shall be measured during the initial stage of well purging. As well evacuation continues, the instruments required for field analyses will be calibrated (Section 5.6). Before evacuating the entire purge water volume, field-determined parameters will be monitored for stabilization. Once the field determined parameters have stabilized and the purge volume has been evacuated from the well, sample collection will proceed. Samples shall be collected for specific analytes as specified in Section 5.9. Following the collection of samples, trip blanks, equipment blanks, spikes and duplicate samples will be prepared (Section 5.9.11). All samples will be labeled, sealed, packaged and documented in accordance with the chain of custody procedures identified in Section 6. All non-dedicated sampling and pumping equipment will be decontaminated appropriately (Section 5.2) and the well cap will be secured and locked prior to leaving the sampling site.

Field personnel shall be adequately trained and be familiar with the sampling procedures prescribed in Section 5.9. In addition, field personnel shall be versed on the sampling procedures for specific target compounds. These are described in detail below. Note that holding times are specified for each compound group. These are the maximum times the sample may be retained before analysis. The maximum holding time includes handling and shipping times and lab holding times.

5.1 Special Precautions

Several precautions must be taken during the sampling of monitoring wells to assure the integrity of the sample and to protect the field personnel doing the sampling. Each individual must be familiar with the site Health and Safety Plan and with the specifications for the individual wells to be sampled. The Health and Safety Plan documents the required personnel protective equipment needed for site specific areas, including those areas requiring access for sampling purposes. Precautions specific to sampling techniques are as follows:

- Do not sample downwind from sources of volatile organics (such as vehicle or generator exhaust, open fuel tanks). These are potential sources of sample contamination. If it is unavoidable to sample downwind from any of these sources, note this in the Field Log Book.

- Leave the caps on the sample containers until immediately before filling them. This lessens the chance of airborne contaminates compromising the sample.

- Avoid handling the teflon liners from the sample bottle caps. Do not use any liner that falls out of the cap onto the ground.

- When sampling multiple wells, sample the up-gradient wells before sampling the down-gradient wells. Down-gradient wells are more likely to have constituents that are transferable between wells, and this practice will lessen the chance of cross contamination of samples between wells.

- Wear clean surgical latex or rubber gloves when taking samples and handling sample containers, especially those that require the addition of preservatives.

- Maintain the cleanness of sampling equipment by limiting its exposure to outside elements and by keeping it on a clean surface off the ground. If any of the equipment is suspect, do not use it until it has been properly decontaminated.

- If wind is excessive (greater than 25 mph) and airborne contaminates may jeopardize sample integrity, cease field operations until conditions are more appropriate.

- Never return used buffer solutions or preservatives to the source bottle. Discard them instead.

- Assure that all samples are properly screened by a Health Physicist to determine if there is radioactive contamination.

- Maintain Field Log Books in a thorough and accurate manner.

- Monitoring probes should not be placed in sample jars containing ground water samples for lab analyses.

- Care must be taken to ensure that water remaining in sampling hoses and equipment is drained into the purge water storage container and not allowed to drain onto the ground.

- Organics should not be filtered.

- Sample containers should be appropriate to the type of analyte and properly decontaminated.

- The wellhead should be locked when sampling is not in progress. Only designated personnel should have keys for wellhead locks.

- The sampling order should be determined prior to field work.

- Sampling personnel should assure that containers have no head space after introduction of the sample.

- Sampling personnel shall determine if filtering of the sample solution is necessary.

- Sampling personnel shall assure that the proper sample preservation medium is selected.

- Turbidity shall be measured between samples and results shall be documented on the appropriate field records.

- Sampling personnel shall assure that all appropriate field blanks, trip blanks, duplicate samples and spike samples are taken and properly identified and shipped.

5.2 Equipment Decontamination

All non-dedicated sampling equipment that may contact the sample must be decontaminated before and after each use. Non-dedicated pumps or bailers require decontamination of internal and external parts prior to being lowered into the well.

Decontamination of non-dedicated equipment shall be conducted in accordance with the following steps:

(1) equipment shall first be washed with clean tap water of known and acceptable chemistry;

(2) equipment shall then be washed with a strong non-alcoholine detergent (for example, RBS-35, a trademark of Pierce Chemical Co., Rockford, IL., or an equivalent);

(3) the non-alcoholine detergent wash shall be followed by a tap water rinse;

(4) equipment shall then be washed with a non-phosphate detergent;

(5) the non phosphate detergent wash shall be followed by a tap water rinse;

(6) equipment shall then be washed with a weak hydrochloric acid (HCl) solution;

(7) the HCl wash shall be followed by a tap water rinse;

(8) equipment shall then be washed with reagent grade methanol; and

(9) the methanol wash shall be followed by a final distilled/deionized water rinse.

While sampling at a well site, if radioactive constituents are absent or are not of concern with respect to sample analysis and will not interfere with the other constituent analyses, steps 2 and 3 may be omitted from the decontamination procedure. These criteria can also be applied with respect to inorganic constituents and if met, steps 2 through 7 may be omitted.

Prior to leaving a well site all sampling equipment used at the well will be decontaminated using the appropriate steps. If radioactive constituents are present or believed to be present at the well site a WINCO Health Physicist (HP) will be notified. The HP will determine the acceptable activity limits and survey all sampling equipment used at the site for radioactivity. Sampling equipment not meeting acceptable activity limits will be re-decontaminated using Steps 2, 3 and 8 until the equipment is found to be clean and is cleared by the HP.

At a minimum, all spent acid and methanol wash solutions shall be captured and contained. Other spent decontamination solutions shall be captured and contained if a reasonable potential exists for the spent solutions to contain hazardous substances. Containers will be labeled in accordance with WINCO's specifications for radioactive and non-radioactive wastes.

5.3 Environmental Monitoring

The potential exists for airborne contaminants to collect at the well head between sampling intervals. This is particularly true of volatile organics. These contaminants may present a threat to human health during sample collection and the well head should be monitored to determine if such a potential exists. For detection of organic compounds, the Organic Vapor Analyzer (OVA), the Photoionization Detector (PID), and the Organic Vapor Meter (OVM) are effective. The instrument chosen for field monitoring should be calibrated and operated in accordance with manufacturer's instructions.

The Well Information Sheet may indicate the possible volatiles that may be encountered at each well site, determined from the initial characterization. Field personnel must determine if the contamination at the well head is potentially dangerous, thus requiring personal protective equipment, such as SCBAs or air purifying respirators, and special sampling procedures. If the potential for an explosive environment exists, sampling may require the use of hand pumps only.

The site HSP and RWP must be reviewed and understood by field personnel before any field sampling is initiated. Precautions for working in a hazardous environment shall be followed where required.

5.4 Water Level Measurement

Water level measurements are taken to determine piezometric head in the aquifer or to determine water level changes during aquifer testing. Water level data will be recorded on Water Level Record Sheets (Exhibit C). The following procedure will be employed to establish a uniform method of measuring water levels in wells.

Graduated steel measuring tapes are more accurate than electrical water-level sounders (EWS) and should be used when an accurate measurement is required. An EWS can be used to determine the approximate depth-to-water and may be the preferred technique for measuring depth-to-water during periods of rapid water level change (for example, during aquifer testing), when the inside of the casing is wet, or when immiscible layers are present above the surface of the water.

All downhole instruments shall be cleaned before and after water level measurements are made, following the procedures in Section 5.2. Spent decontamination solutions shall be captured, contained and handled in accordance with guidelines established in Section 5.2. Store and transport the tapes in such a way as to minimize contamination.

Each EWS or steel tape used for recording water levels shall have the depth graduations checked with an independent folding rule or measuring tape for calibration prior to field use.

5.4.1 Steel Tape Method

The procedures for water level measurement with a steel tape are as follows. These procedures assume the tape starts at zero, is marked in hundredths of a foot increments from zero to one foot, and is marked in one foot increments thereafter.

1) Measure and record the distance from ground level to the top of casing. Measure the vertical distance from the top of casing to the point of the elevation survey mark to determine the elevation of the top of the casing. Depth to water is measure from the top of the well casing and the elevation of the water table is determined by subtracting the measured depth to water from the elevation of the top of the casing.

2) Find the estimated historical water level in the well information sheet, or use an EWS to find the approximate depth to water.

3) Chalk the lower 5 feet of the steel tape.

4) Lower the steel tape from the top of the casing to the estimated water level. To avoid splashing at the water surface, lower the tape slowly into the water.

5) Once the estimated water level has been reached, continue to lower the tape to the nearest foot mark, hold the nearest foot mark against the top of the casing, and record this value (held value) in the designated place on the form.

6) Without allowing the tape to move any farther into the well, remove the tape from the well.

7) If the water level can be observed on the chalked portion of the tape, read the distance between the zero mark on the tape and the wet line (cut value) to the nearest 0.01 foot. If all of the chalked portion of the tape is dry, repeat the procedure, allowing more of the tape to go down into the well. If all of the finely graduated portion is wet, dry the tape, rechalk it and repeat the procedure allowing less tape to go down the well. Record the cut value to the nearest 0.01 foot.

8) Calculate and record the depth to water on the Water Level Record Sheet by subtracting the cut value from the held value.

9) When all measurements in a single well are completed, decontaminate the steel tape as described in Section 5.2.

10) Dry the steel tape to prevent it from rusting.

5.4.2 EWS Method

An electric water level sounder is essentially an open circuit involving an ammeter and a battery mounted on a reel on which an insulated two-wire electric cord is wound. The circuit is closed when the exposed ends of the two wires are immersed in water. Current flow is registered on a meter on the reel and is indicated by the light and buzzer. The procedure for water level measurement with an EWS tape is as follows:

1) Turn on the indicator and turn the sensitivity switch to full sensitivity.

2) Push the test button to see if the battery is charged and the buzzer and light are working.

3) Lower the probe into the well casing until the buzzer or light indicates contact with the water.

4) Mark the wire at the location adjacent to the top of casing.

5) Remove the probe from the casing and measure to the nearest 0.01 foot the distance between the mark (cut value) and the nearest graduation mark (held value) on the electric cord using a measuring tape that is scaled to hundredths of a foot. Record this value.

6) Calculate and record the depth to water on the Water Level Record Sheet. If the water level is deeper than the nearest graduation marked on the cord, add the cut value to the held value to obtain the depth to water. If the water level is shallower than the nearest graduation marked on the cord, subtract the cut value from the held value to obtain the depth to water.

7) When all measurements are complete at the well, decontaminate the EWS as described in Section 5.2.

5.4.3 Water Level Elevation

The water level elevation in a well is obtained by subtracting the depth to water from the elevation of the measuring point:

Water level = top of casing elevation - depth to water

5.5 Detection and Sampling of Immiscible Layers

Groundwater shall be examined in the following manner for the presence of any floating immiscible layers; if detected they shall be sampled prior to purging any water from the well. A positive response in the initial volatile organic survey of the well head conducted in response to health and safety requirements (see Section 5.3) serves as an effective indicator of the presence of any immiscible layers. After the water level measurement has been taken in compliance with Section 5.4, an interface probe shall be lowered into the well.

An interface probe is equipped with an infrared beam and receptor to detect non-conductive liquid (immiscible layers). An open circuit is used in the probe/meter system to detect water. When the interface probe is lowered down the well and comes in contact with a non-conductive liquid, the infared beam is refracted and a buzzer sounds. As the probe passes through the immiscible layer(s) and enters the water the conductivity of the water completes the open circuit and a second buzzer sounds. Noting the depth when the first buzzer sounds (probe entered non-conductive liquid) and the depth when the second buzzer sounds (probe entered water) allows the thickness of the immiscible layer to be determined. After the depth and thickness of the immiscible layer has been determined a bailer shall be lowered into the well and the upper surface of the liquid/water in the well sampled. The bailer shall not become completely submerged. If an immiscible layer exists, it shall be transferred to a 40 to 125 ml glass vial with an airtight, teflon-lined septum cap. The sample shall not be filtered or preserved with additives, but shall be placed in a 4°C cooler and secured for storage and transport.

5.6 Well Purging Procedures

The water standing in the well prior to sampling may not be representative of the in-situ groundwater quality. Therefore, the water standing in the well and filter pack (if present) must be pumped from the well (purged) so that formation water can replace stagnant water. The following procedures describe the steps to be followed to purge a well.

5.6.1 Purging The Well

The procedure to purge a well before sampling depends on the hydraulic yield characteristics of the well. With respect to purging, wells are characterized as either high yield or low yield. Wells capable of yielding three well bore storage volumes during purge pumping are designated as high yield, and those wells incapable of yielding three well bore storage volumes are designated as low yield. To properly purge high yield wells, a minimum of three well bore storage volumes of water shall be removed from the well by pumping. The well bore storage volume is the volume of water enclosed by the well screen and gravel/sand pack at equilibrium. To calculate the well bore storage volume, the diameter of the well in the screened interval must be determined and the depth to water must be measured and subtracted from the total depth of the well (see details below). If a gravel/sand pack surrounds the screen, the pore volume of the gravel/sand pack (assume a porosity of 30 percent if unknown) shall be added to the total volume within the screened interval. While purging water from the well, the conductivity, pH, temperature, turbidity and dissolved oxygen (optional) shall be periodically measured. If the conductivity (within 10%), pH (within 0.1 pH units), temperature (within 0.5 degree C), turbidity (within 10% and less than 5 NTUs) and dissolved oxygen (within 10%) of the water have not stabilized when a minimum of three well volumes have been removed, then continue to remove water until these parameters stabilize as specified.

Large drawdowns in water table wells should be avoided. Purged groundwater that has a reasonable potential of containing hazardous substances shall be captured and characterized prior to discharge or disposal.

If the well is incapable of yielding three well bore storage volumes (low-yield wells), even at extremely low discharge rates (< 1 gallon per minute), the well should be pumped until dry. As soon as the well recovers sufficiently, the first sample should be tested for pH, temperature, specific conductance and turbidity. Samples should then be collected and containerized in the order of the parameter's volatilization sensitivity. The well should be retested for pH, temperature, specific conductance and turbidity after sampling is complete as a check on the stability of the water samples over time. At no time should the well be pumped to dryness if the recharge rate causes the formation water to vigorously cascade down the sides of the screen and cause an accelerated loss of volatiles. If this situation occurs, the pump discharge rate should be reduced.

5.6.2 Purge Volume Calculations

A minimum of three well bore storage volumes should be pumped from the well before collecting a groundwater sample. The formula used to calculate well bore volume is shown below.

1) Three bore storage volumes:

   a) $PV(\text{feet cubed}) = 3(l \times \pi \times r^2)$,
   b) $PV(\text{feet cubed}) \times 7.48 = PV(\text{gallons})$ where,

   PV = three purge volumes (feet cubed)
   l = depth to water (feet) subtracted from depth to the bottom of the borehole (feet)
   $\pi = 3.14$
   r = radius of the borehole (feet) or screen radius if a filter pack is present
   7.48 = a conversion factor from feet cubed to gallons

2) Three filter pack (if present) storage volumes:

   a) $PVF = 3(l \times \pi \times [r^2_{sc} - r^2_{bh}]) \times 0.30$
   b) $PVF(\text{feet cubed}) \times 7.48 = PVF(\text{gallons})$ where,

   PVF = three purge volumes for filter pack
   0.30 = porosity estimated for average sand pack
   r^2_{sc} = radius of the screen
   r^2_{bh} = radius of the borehole in the screened interval
   l = depth to water (feet) subtracted from depth to the bottom of the borehole (feet)
   $\pi = 3.14$

3) Total minimum purge volume (gallons) = PV(gallons) + PVF(gallons)

The depth to bottom of the borehole is the total drilled depth and should include the thickness of drill cuttings or sand pack below the screen. However, a volclay or grout plug may serve as an effective bottom to the borehole due to its low permeability characteristics. The porosity for the sand pack is estimated at 30 percent which is considered an average value for sand. When computing purge volume, the units need to be the same. Always re-check your calculations.

5.6.3 Discharge Measurements

The discharge rate during purging shall be measured with a flow meter or with a container of known volume. The flow meter shall have a current laboratory calibration, as indicated by a calibration sticker showing a recall date no earlier than the date of use. The flow meter shall be checked in the field before use by independently computing the flow rate with a container of known volume. The results of this check shall be documented.

If a container of known volume is used to measure flow rate, a stop watch shall be used to determine the time it takes to fill the container. If this method is used, three measurements shall be taken and averaged.

At a minimum, three flow rate measurements shall be taken during purging activities. Discharge measurements, calibrations and types of equipment shall be documented.

5.6.4 Purge Water Monitoring

The following are procedures for instruments that will be used to monitor purge water for stabilization as an indication that water is being removed from the formation and the stagnant water in the well has been purged. Field analyses with these instruments will be performed during purging and at the completion of sampling to minimize the potential to contaminate a sample. A separate sample or aliquot shall be collected for each instrument used in monitoring the stabilization of purge water. A single aliquot may be used for instruments with a combination of probes. Monitoring probes should not be placed in shipping bottles containing groundwater samples for laboratory analysis.

Calibration of Instruments

All field personnel should be familiar with and instructed in the use of all equipment used in the sampling procedures. Several pump systems may be used in the monitoring network. Hydrostar pumping systems have been installed in several wells at the ICPP. Hydrostar is a trade mark of Instrumentation Northwest, Inc. Redmond, Washington. Operating procedures for the pump systems are presented in Appendix A. All other equipment shall be operated in accordance with manufacturer's instructions.

All instruments used for field analyses shall be calibrated in accordance with the manufacturer's instructions. Field personnel are responsible for verifying acceptable calibration status for all equipment or instrumentation used during sampling. All instruments should be accompanied by a copy of the manufacturer's operating manual. The pH meter, conductivity meter, dissolved oxygen meter and turbidity meter require field standardization either before or during sampling.

Monitoring probes should not be placed in sample jars containing ground water samples for lab analyses.

pH Measurement. A pH meter shall be used to measure the pH of the sample on an aliquot of purged water that was obtained just before or after sampling. Measurements shall be made immediately on the aliquot. Calibration shall be performed in accordance with the manufacturer's procedures. Calibration shall be performed with standardized buffered pH solutions and conducted prior to each use of the meter. Before and after each reading, the probe shall be thoroughly rinsed with distilled/deionized water. The pH shall be recorded to one-tenth (or one-hundredth if the meter is stable enough) of a pH unit.

Conductivity Measurement. A conductivity probe shall be used for conductivity measurement on an aliquot of purged water obtained just before or after sampling. Measurements shall be made as soon as possible on the obtained aliquot. The meter shall be calibrated in accordance with the manufacturer's procedures with standardized KCl solutions. At a minimum, calibration shall be performed at the beginning and end of each day the equipment is used. The conductivity shall be recorded to two significant figures. The temperature of the sample at the time of conductivity measurement shall also be recorded. The probe must be thoroughly rinsed with distilled or deionized water before and after each use.

Turbidity Measurement. A turbidity meter shall be used to make turbidity measurements on aliquots of water samples obtained prior to or after sample acquisition. Measurements shall be made as soon as possible on the obtained aliquot. Operation and calibration shall be in accordance with the manufacturer's procedures. Standardized formalin solutions shall be used for calibration. The instrument shall be calibrated at least once during the purging and sampling of each well. The outside of the glass vials used for containing the aliquot for measurement must be wiped thoroughly dry before and after each use. Measurements shall be recorded to the nearest 0.1 NTU when less than 1 NTU; the nearest 1 NTU when between 1 and 10 NTU; and the nearest 10 NTU when between 10 and 100 NTU.

Temperature Measurement. The thermometer reading shall be allowed to stabilize and shall be recorded to the nearest 0.5 degree centigrade. The thermometer shall be rinsed with distilled/deionized water before and after each use.

Dissolved Oxygen Measurement (Optional). A dissolved oxygen meter is used to measure dissolved oxygen (DO) in water samples. Measurements shall be made immediately on aliquots obtained just before or after sample acquisition. The meter shall be calibrated in accordance with the manufacturer's procedures using distilled/deionized water that has been allowed to equilibrate with the atmosphere at a given elevation. Measure the temperature and concentration of dissolved oxygen in the sample while the salinity selector is on the fresh water setting. The probe must be thoroughly rinsed with distilled/deionized water before and after each use. Measurements shall be recorded to the nearest 0.1 ppm concentration.

Unless otherwise stated, the instruments shall be calibrated prior to purging and at the completion of sampling at each well. Instrument calibration shall be documented with the instrument number, internal calibration date and company number. Only equipment with a calibration tag showing a recall date later than the anticipated date of use shall be taken to the field. Each instrument should be accompanied by a copy of the manufacturer's operation manual.

5.6.5 Capture and Disposal of Purge Water and Decontamination Solutions

Purge Water

Purged groundwater shall be captured and contained in 55 gallon DOT approved drums or suitable tanks, if a reasonable potential exists for the groundwater to contain hazardous substances.

If required, each drum or tank containing captured purge water shall be properly labelled with a weather proof label stating the contents, the well from which the contained purged water originated, and the date on which the contents were generated. Storage of the drums or tanks shall be as specified in the WINCO Purge Water Plan.

Captured and contained purge water shall be characterized for discharge, treatment and/or disposal. The requirements and options available for discharge, treatment and/or disposal are dependent upon many variables such as chemical consistency, local and state regulations and site location. Discharge, treatment and/or disposal of captured and contained purge water must be in accordance with local, state and federal regulations and shall be as specified in the Purge Water Plan.

Decontamination Waste Solutions

Decontamination waste solutions that are generated during purging and groundwater sampling include: spent detergent wash solutions; any spent methanol rinses, any spent weak acid rinses; spent tap water rinses; and spent final distilled/deionized water rinses. All spent acid and methanol rinses shall be captured and contained in approved plastic buckets or drums. Other spent decontamination waste solutions shall be captured and contained in appropriately sized buckets or drums, if a reasonable potential exists for the spent solutions to contain hazardous substances. The Groundwater Monitoring Plan shall address whether spent decontamination solution shall require capture and containment.

Captured and contained decontamination waste solutions shall be generally subject to the same procedures as described for purge water, however, some noteworthy differences are as follows: (1) all acid solutions shall be neutralized to a pH of between 6.0 and 8.5 prior to discharge or disposal; and (2) if quantities of decontamination waste solutions (detergent washes, rinse waters, neutralized acid solutions) are sufficiently small they may be added to the captured and contained purge water that corresponds to the same well sampling effort.

5.7 Pumping Rate

Subject to the following constraints, the pumping rate shall be maximized while purging the three well bore storage volumes and continued until the field test parameters identified in Section 5.6 have stabilized:

(1) The pumping rate should not result in water cascading into the well through the well screen.

(2) If the parameters of interest in the investigation include VOCs, care must be taken to ensure that the pumping rate does not induce degassing within the well.

(3) Where the well screen and sand pack are completely below the water table, the rate of pumping should be controlled such that it does not draw the water level in the well below the top of the screen.

(4) Where the well screen is intersected by the groundwater level, the rate of purging shall correspond with the rate of sampling.

(5) When sampling for VOCs or other parameters with volatile fractions (such as TOC or TOX), pumping rates should be between 10 and 100 ml/min.

5.8 Special Sample Considerations

Field personnel shall collect and containerize samples in the order of volatilization sensitivity of the analytes being sampled for. The following list of analytes was prepared by EPA (1986b) and is given in preferred order of collection:

- Volatile organics (VOC)
- Purgeable organic carbon (POC)
- Purgeable organic halogens (POX)
- Total organic halogens (TOX)
- Total organic carbon (TOC)
- Extractable organics
- Total metals
- Phenols
- Cyanide
- Sulfate and chloride
- Turbidity
- Nitrate and ammonia
- Radionuclides

Analyses for several analytes require samples to be filtered during collection. An in-line filter system is the most efficient method, and offers less chance for sample contamination. However, a less preferred but acceptable method is to collect an adequate amount of sample in a properly cleaned and prepared high density linear polyethylene or glass bottle. Samples are then immediately fed through an external vacuum pump filter system and collected directly into the appropriate sample bottle. (Note: new filters shall be used for each sample and the filter system must be decontaminated before and after each use.)

Procedures for preparing the various containers for specific analyte analyses are identified below and in Exhibit B. However, it may be assumed that sample containers received from a manufacturer or an analytical laboratory have been prepared in accordance with specifications and will require no further preparation, provided they have been properly stored and remain free of contamination.

5.9 Sampling Methods

5.9.1 Purgeable Volatile Organics

Samples for purgeable volatile organics shall be obtained first. Samples for purgeable volatile organics shall be removed from the well using a permissible positive-pressure pump or bailer and shall be collected directly from the pump discharge tube or bailer into clean, properly prepared 40 ml or 125 ml glass vials with teflon-lined silicon septum caps. Prior to sample collection, vials shall be detergent washed and rinsed with distilled water, and kiln dried for more than one hour. Contact with air and sample agitation should be minimized. If necessary, pumping rates may be significantly reduced during sampling for volatile organics. These samples shall not be filtered, and will be preserved with HCl to a pH of less than two. Immediately after collection the septum cap shall be tightened onto the vial. There should be no air space (no visible meniscus) remaining within the vial once the cap has been fastened; if air is present, a new sample shall be taken by the same procedure. Samples shall be stored at temperatures less than 4°C. The maximum holding time for samples for volatile organic analytes is 14 days.

5.9.2 Samples for Extractable Base-Neutral/Acid Organic, Phenolic Compound, PCB and/or Pesticide Analyses

Samples for extractable base-neutral/acid organic, phenolic compound, PCB and/or pesticide analyses shall be collected directly from a positive-pressure pump discharge port or bailer in appropriate sample bottles. Sample bottles shall be 500 ml narrow mouth glass jars with teflon-lined air tight caps. These groundwater samples shall have no preservatives, except for phenols which should be preserved with sulfuric acid (H_2SO_4) to a pH of less than 2. Sample containers shall be cleaned with a detergent wash and distilled water and kiln dried (450°C) for more than one hour. Samples shall not be filtered. The maximum holding times of samples for extractable organic analytes is seven days. Upon receiving samples for extractable organic analyses the analytical laboratory will extract the organic constituents from the sample with a methylene chloride extraction method. In doing so the organic constituents will be transferred from the sample to the methylene chloride and the holding time increased to 40 days.

5.9.3 Samples for Major Cation, Metal and Metallic Radionuclide Analyses

Samples for major cations, metal and metallic radionuclide analyses shall be filtered. Samples are filtered to remove particulate matter and/or sediments that may release metals and bias results when subjected to the acidic preservatives. Filtration is best accomplished with the use of an in-line filter system in which the sample is directly fed from the discharge port of a permissible positive-pressure pump through a 0.45 micron filter and into the appropriate sample bottle. Sample bottles for radionuclide analyses shall be 500 ml polyethylene bottles prepared by a distilled water rinse. Sample bottles for metal analyses shall be 250 to 500 ml narrow-mouth high density linear polyethylene bottles prepared for use by soaking in 20% HNO_3 and rinsed with distilled/deionized water. These groundwater samples shall be preserved with nitric acid (HNO_3) to a pH of less than 2.

In addition, if toxic metal or priority pollutant metal analyses are to be performed, an unfiltered aliquot will also be obtained (in addition to the filtered aliquot) directly from a permissible positive-pressure pump discharge port or from the bailer into appropriate sample bottles and preserved with nitric acid (HNO_3) to a pH less than 2. The only exception is analysis of chromium VI, in which case preservatives shall not be added to the sample.

Maximum holding time for radionuclides and metals with the exception of chromium VI and mercury analytes is six months. The maximum holding times for chromium VI and mercury are 24 hours and 28 days respectively.

5.9.4 Cyanide Analyses

Samples for cyanide analyses shall be collected directly into appropriate sample bottles from the bailer or the port of a permissible positive-pressure pump. Sample bottles shall be 500 ml narrow-mouth, high-density linear polyethylene jars with air tight caps, prepared with a distilled/deionized water rinse. Samples shall not be filtered. Samples shall be immediately preserved with sodium hydroxide (NaOH) to a pH greater than 12 and 0.6 g per liter of ascorbic acid shall be added. Samples shall be stored at temperatures of less than 4°C. The maximum holding time of samples for cyanide analytes is 14 days.

5.9.5 Major Anion and Biological Oxygen Demand (BOD) Analyses

Samples for major anions (chloride, fluoride, sulfate, nitrate, nitrite alkalinity, acidity, total silica, bromide) and for biological oxygen demand shall be collected directly into 250 to 500 ml narrow-mouth, high-density linear polyethylene jars with air tight caps prepared by a distilled/deionized water rinse. Samples shall be collected directly from the port of the pump or from the bailer. These samples do not require filtration, but may be filtered, if desired. Preservatives shall not be added. The maximum holding time of samples for anion analytes and BOD analyses is 28 days except for those for nitrate and nitrite which have a maximum holding time of 48 hours.

5.9.6 Total Phosphate and Orthophosphate Analyses

Groundwater samples for total phosphate and orthophosphate analyses shall be immediately filtered after initial sample acquisition. Filtration is best accomplished with an in-line system in which a positive-pressure pump discharge port feeds groundwater directly through the filter system into 250 to 500 ml narrow-mouth, high-density linear polyethylene jars with air tight caps prepared by a distilled, deionized water rinse. Samples shall be immediately preserved with sulfuric acid (H_2SO_4) to a pH less than 2. The maximum holding time of samples for total phosphate and orthophosphate analyses is 14 days.

5.9.7 Nitrogen Compounds, Chemical Oxygen Demand, and Oil and Grease Analyses

Groundwater samples for nitrogen compounds, chemical oxygen demand, oil and grease, and total organic carbon analyses shall be collected directly from a permissible positive pressure pump discharge port or from a bailer into 125 ml glass jars with air tight caps prepared by a distilled/deionized water rinse. These samples shall not be filtered and shall be preserved with sulfuric acid (H_2SO_4) to a pH less than 2. The maximum holding time of samples for the above analytes is 14 days.

5.9.8 Total Organic Carbon (TOC) Analyses

Groundwater samples for TOC analyses collected directly from a permissible positive pressure discharge port or from a bailer into at least two 40 ml, amber colored glass sample bottles with teflon-lined, septum caps. Glassware shall be prepared with a distilled/deionized water rinse. These samples shall not be filtered and shall be preserved with hydrochloric acid (HCl) to a pH less than 2 and stored at temperatures of less than 4°C. The maximum holding time for samples for TOC analytes is 28 days.

5.9.9 Total Dissolved Solids

Groundwater samples for analyses of total dissolved solids shall be immediately filtered in the field. Filtration is best accomplished with the use of an in-line filter system in which the sample is directly fed from the discharge port of permissible positive-pressure pump through the filter and into the appropriate sample bottle. Samples shall be collected in 250 to 500 ml narrow-mouth, high-density linear polyethylene jars with air tight caps prepared by a distilled, deionized water rinse and shall not be preserved with additives. The maximum holding time of samples used in the analysis of total dissolved solids is six months.

5.9.10 Total Organic Halogens (TOX)

Samples for total organic halogens shall be pumped from the well using a permissible positive-pressure pump or bailer and shall be collected directly from the pump discharge tube or bailer into properly cleaned and prepared 500 ml amber glass narrow mouth bottles with teflon-lined silicon septum caps. The bottles shall be gently filled from the bottom up (the sample is gently poured down the side of the container) to the point of overflowing. Prior to sample collection, bottles shall be detergent washed and rinsed with distilled water and kiln dried for more than one hour. Preservation of TOX samples requires that sulfuric acid (H_2SO_4) be placed in the sample bottle to a pH of less than 2. Contact with air and sample agitation should be minimized. If necessary, pumping rates may be significantly reduced during sampling for volatile organics. These samples shall not be filtered. Immediately after collection the teflon septum cap shall be tightened onto the bottle. There should be no headspace (air) remaining in the bottle once the cap has been fastened; if air is present, a new sample shall be taken by the same procedure. Samples for TOX should be stored at temperatures less than 4°C. The maximum holding time for TOX samples is 7 days.

5.9.11 QA/QC Samples

The quality of the samples obtained shall be subject to in-process checks by means of duplicate, blank, and spike sampling techniques. Numbers and types of quality control samples to be taken in the field and laboratory are based on EPA guidance (EPA, 1986a). Field quality control samples shall not be identified as such to the analytical laboratory.

Field Quality Control Samples

- Field Duplicate Samples: Field duplicate samples are identical samples collected at the same time, in the same way, and contained and transported in the same manner. Field duplicate samples shall be analyzed by the same laboratory in two separate analyses as an indicator of gross errors in sampling techniques. At a minimum, 5 percent of the total samples collected should be duplicated. Duplicate sampling shall be distributed evenly throughout each sampling period.

- Field Blanks: Field blanks are samples prepared with distilled deionized water for evaluating field sampling procedures. Field blanks shall consist of pure organic-free deionized/distilled water, transferred into a sample container at the site. If the field blank is being prepared for a sample that was filtered, the distilled deionized water shall also be filtered prior to transfer to the sample container. Field blanks are used as an overcheck for environmental contamination, and shall be analyzed at a 5 percent frequency for all samples. Field blanks are useful in identification of possible sources of contamination of samples due to improper preparation, collection or handling procedures.

The result of the analysis of the field blanks should not be used to alter the ground-water analysis data. It should be used to determine the source of contamination and corrective measures should be made to eliminate further problems. Wells included within the suite for which a contaminated blank was found must be resampled.

- Trip Blanks: Trip blanks are blanks that are transported to the sampling site, handled as field samples, and then transferred to the analytical laboratory. Each time a group of containers is prepared for sampling one container of each type (amber glass, glass, polyethylene) from the batch shall be filled with distilled/deionized water and transported to the sampling site as a trip blank. As with field blanks, if the trip blank is being prepared for a sample that was filtered, the trip blank must also be filtered. The blank shall be handled like a sample container but returned unopened to the laboratory for analysis. It is recommended that trip blanks be prepared at a frequency of 5 percent or one container from each batch, whichever is less. Trip Blanks will be prepared only for samples to be analyzed for VOCs.

- Equipment Blanks: Equipment blanks consist of distilled/deionized water that has been passed through a sampling device. Equipment blanks shall consist of pure organic-free deionized/distilled water run through clean, decontaminated, non-dedicated sampling equipment (bailers and pumps), placed in containers identical to those used for actual field samples, and sent to the analytical laboratory. Equipment blanks shall be used to verify the adequacy of sampling equipment decontamination procedures, and shall be collected at a 5 percent frequency for all samples. Contamination found in equipment blanks may be attributed to (1) insufficient decontamination of sampling equipment, (2) contaminated rinse water, or (3) handling procedures that alter the sample analysis results.

Laboratory Quality Control Samples

- Matrix Spiked Samples: Matrix spiked samples require the addition of a known quantity of representative analyte of interest to the sample as a measure of recovery percentage and as a test of analytical accuracy. The spike shall be made in a replicate aliquot of a field duplicate sample and sent to the analytical laboratory with field samples. One sample shall be spiked per analytical batch or for every 20 samples, whichever results in the greater number of samples. Each matrix spiked sample shall then be split into two replicate aliquots, which shall be analyzed separately as an overcheck of precision. In addition, other types of laboratory quality control samples shall be analyzed in accordance with the laboratory's contractual requirements.

6. DOCUMENTATION

At the time of collection all samples shall be labeled, sealed, and appropriately stored in the custody of the sample custodian. Documentation for sampling groundwater includes completing Sample Integrity Data Sheets, Field Report Forms, and Chain of Custody Records, and securing individual samples or sample coolers with chain of custody seals.

6.1 Sample Labels

Samples shall be immediately labeled (see Exhibit D for an example label). Labels shall be water proof. Information shall be recorded on each label with indelible ink. All blanks shall be filled in (write N/A if not applicable). Groundwater sample designations will be as specified in the project work documents or by the Project Manager.

6.2 Sample Integrity Data Sheets

Sample Integrity Data Sheets (Exhibit E) are used by field personnel to document the official raw field information for each sample that will be chemically analyzed. All blanks shall be filled in (write N/A if not applicable). The original must be submitted as soon as possible to the Document Custodian for filing.

6.3 Chain of Custody Records

Chain-of-Custody Records (Exhibit F) will be used to record the custody and transfer of samples in accordance with procedures in Section 7. These forms shall be filled in completely (write N/A if not applicable). Tamper-proof Seals (Exhibit D) shall be placed on either sample bottles or shipping coolers. The seal number shall be recorded on the Chain of Custody Form.

6.4 Sample Packaging

All samples shall be packaged appropriately for shipping to protect them from damage, to ensure that moisture content and/or chemical integrity is maintained where necessary, and to ensure that appropriate temperatures are maintained as required. All sample shipping containers and individual sample bottles shall be sealed to identify possible tampering.

6.5 Sample Examination

Prior to transfer of samples, the sampler shall ensure that:

- labels are affixed and completely filled out,
- seals are intact and completely filled out,
- special handling and storage requirements are identified where required,
- sample integrity data sheets are complete when required by the laboratory,
- the chain of custody is completed and sample contents documented on the chain of custody matches the samples that are being shipped,
- there are no indications of sample container leaks or other questionable conditions (for example, not enough blue ice to keep samples at 4°C during transport to the laboratory), and that
- hazardous and/or radioactive samples are clearly identified as such.

Samples that do not meet the requirements for initial transfer shall be referred to the Field Engineer for disposition.

7. SAMPLE CHAIN-OF-CUSTODY

This section establishes the requirements for documenting and maintaining sample identification and integrity from the point of origin to receipt of the sample at the analytical laboratory. Custody responsibilities are effectively met if the samples are:

- in the responsible individual's physical possession,
- in the responsible individual's visual range after having taken possession,
- secured by the responsible individual, in an area in which access is restricted to only that individual.

Environmental samples must be tracked, handled and transported in a manner that sample integrity and identification (to the location and interval at which they were obtained) is maintained. A sample custodian must maintain proper storage and custody of samples from the time of collection until transport to the laboratory. The sampler shall initiate Chain of Custody forms which accompany samples from the collection site to the laboratory and provide documentation of any transfer of custody throughout transport. Sample identification shall be ensured by the application of labels to the sample containers at the time of collection. Seals shall be placed on sample bottles and containers as a verification of sample integrity. Seals and labels shall be verified upon receipt of samples at the analytical laboratory; unacceptable samples shall be identified on the Chain of Custody form, and referred to the Field Engineer or Project Manager for evaluation and appropriate disposition.

7.1 Chain of Custody Form Initiation

The Sampler shall initiate the Chain of Custody for the initial transfer of samples. The following information shall be entered on the form:

- the destination of the samples and the transporter or carrier,
- the project number and sampling site,
- the date and time of sample collection,
- the sample identification numbers and descriptions, and
- the type of analyses to be performed.

When all required information has been entered the Sampler shall sign the Chain of Custody form as the initiator.

7.2 Transfer of Custody

To document the initial transfer of samples, the Sampler relinquishing custody and the transporter accepting custody shall sign, date, and note the time of transfer on the Chain of Custody form. If the transporter is a courier service, the shipping receipt will be retained and stapled to a copy of the chain of custody in-lieu of the courier service signing the chain of custody. The Chain of Custody form is in triplicate. One copy is retained by the sampler. The original form and the remaining copy shall accompany the samples.

7.3 Receipt at Destination

Upon arrival at the analytical laboratory, the temperature of individual sample bottles and containers shall immediately be determined without opening the bottles. The Laboratory Sample Custodian shall also inspect the transferred samples to ensure that:

- the seals are intact,
- labels are affixed on sample containers and legible,
- sample integrity data sheets are included when required,
- the physical condition of the samples is acceptable (for example, no broken containers), and
- the samples being transferred directly correspond to those listed on the Chain of Custody form.

If the integrity of the samples is questionable, the Laboratory Technician shall notify the Project Manager, segregate the unacceptable samples and identify them on the Chain of Custody Form. Otherwise, the Laboratory Sample custodian and the transporter shall sign, date, and note the time of transfer on the Chain of Custody form. If the transporter is a courier service, the Laboratory Sample Custodian may identify the carrier reference bill of lading number in-lieu of the transporter's signature. The Laboratory Sample Custodian shall retain the remaining copy of the Chain of Custody form and forward the original to the Field Engineer. Appropriate laboratory custody procedures shall be initiated upon completion of transfer of custody in compliance with the laboratory's internal QA requirements.

7.4 Document Tracking

The copy of the Chain of Custody form recording the initial transfer of samples shall be forwarded to the Field Engineer, followed later by the completed original returned from the analytical laboratory. The Field Engineer shall track the Chain of Custody form to ensure timely completion and receipt of the original, based on the laboratory acknowledgement due date indicated on the form.

After receipt of the completed original, the Field Engineer may discard the copy. The completed original Chain of Custody form shall be forwarded to the Document Custodian. Chain of Custody forms determined to be overdue or incorrectly completed shall be referred to the Project Manager for appropriate action.

8. SHIPPING

Samples will be shipped to the analytical laboratory with a licensed and reputable shipping company offering overnight service. The shipping company must be capable of handling the size and quantity of packaged samples. Finally the shipping company must meet Chain of Custody and DOT requirements for transportation of hazardous and/or radioactive materials.

9. DATA ANALYSIS

The analytical results obtained by the chemical laboratory will be validated by the laboratory in accordance with its internal QA requirements prior to transmitting those results to WINCO. The laboratory will provide WINCO with both the analytical results and the results of any internal QA checks. Additional data validation and appropriateness evaluations may be performed by WINCO, in accordance with the controlling Groundwater Monitoring Plan, or other controlling document, and the QAPjP. Upon completing these analyses, a statistical evaluation is made to test for significant indications of groundwater contamination. The statistical methods to be used are described in the controlling Groundwater Monitoring Plan, or other controlling document, or in the QAPjP.